DOCUMENT RESUME

ED 055 464 FL 002 237

TITLE Wisconsin Papers in Linguistics: Volume 1, Number 1.
INSTITUTION Linguistic Circle of Madison, Wis.
PUB DATE 70
NOTE 104p.

EDRS PRICE MF-$0.65 HC-$6.58
DESCRIPTORS Arabic; Comparative Analysis; Contrastive Linguistics; *Descriptive Linguistics; Form Classes (Languages); Generative Grammar; Hebrew; Indo European Languages; Language Classification; *Linguistic Theory; Morphology (Languages); *Pashto; Phonemics; Phonology; Semantics; *Semitic Languages; Structural Analysis; Syntax; *Tagmemic Analysis; Typology

ABSTRACT

This volume of papers in linguistics is the first in a series of proposed semiannual publications sponsored by the Linguistic Circle of Madison, Wisconsin. The first of the four papers concerns recursive rules, their use, and possible necessity. It is the author's intention to examine some of the properties of rules which he believes to hold for any grammar which describes constituent structure. The author examines certain properties of recursive systems of rules. The second paper provides a detailed discussion of the Bloomfieldian model. The third paper presents some thoughts concerning the hypothesis that Semitic possessed a morpheme of length. Hebrew and Arabic examples are given. The final article makes a study of particular features in Pashto; the findings indicate that Pashto may be an Iranian rather than an Indic language. (VM)

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IN
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Volume I, Number 1
Fall 1970

Linguistic Circle of Madison
Madison, Wisconsin

FL002 237

PREFATORY NOTE

This issue inaugurates the semi-annual publication of WISCONSIN PAPERS IN LINGUISTICS, sponsored by the Linguistic Circle of Madison. The articles contained in these papers constitute progress reports on the various college and university campuses in the state of Wisconsin. These reports are published with the purpose of inviting comments and suggestions on the ideas set forth in them.

All correspondence concerning the journal should be addressed to: The Editor, Wisconsin Papers in Linguistics, Department of Linguistics, 1112 Van Hise, The University of Wisconsin, Madison, Wisconsin 53706.

WISCONSIN PAPERS IN LINGUISTICS

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On Pernicious Recursion[1]

Peter H. Fries
Linguistics Department
University of Wisconsin

In the introduction to Robert Longacre's Grammar Discovery Procedures a generative interpretation of tagmemic formulae is developed by which an infinite number of constructions (at any level) may be produced along with a tree describing the various constituents of each construction and the grammatical functions each constituent manifests within that construction. In the light of this generative interpretation of tagmemic formulae it would seem useful to explore possible systems of tagmemic rules with a view to eliminating those systems which do not properly describe the constructions they generate.

A proper description of the constructions generated by a tagmemic grammar must include the specification of the immediate constituents of those constructions, and since transformational grammarians have discussed extensively the proper form of immediate constituent (or phrase structure) grammars, it seems only natural to begin by examining some of their points to see if they might be applicable to the phrase structure aspect of tagmemic grammars. Some points are clearly not applicable, since they refer specifically to phrase structure grammars which are an integral part of a transformational grammar. Such phrase structure grammars emphasize binary cuts and rely on transformational rules for permutations and readjustments of the forms of morphemes and sequences of morphemes. These phrase structure grammars avoid the overt specification

4

of grammatical function, and as a direct result of this, no rule in the phrase structure component of a transformational grammar may permute elements. Tagmemic rules, on the other hand, do specify functional relations overtly and as a result may be allowed to permute elements. In this paper I would like to examine some of the properties of rules which I believe do hold for any grammar which describes constituent structure; in particular, I would like to examine certain properties of recursive systems of rules.[2]

In the original model of transformational grammar. no recursive rules or systems of rules were allowed. Postal (1964. p. 10-13) states this clearly when he presents the following restrictions on phrase structure rules.

> "condition (2) if $U \rightarrow W$. then:
> a. $U = XAY$ and $W = XZY$
> b. Z is not null...
> c. Z is not identical to A" (p. 10)

After presenting the derivation

> " (v) S, AB, AB, ACD,..." (p. 13)

Postal then continues

"In (v) the procedure of P marker construction yields a tree but this would be identical with that for the quite different derivation containing no repetition. Hence if the claim that a labelled tree represents the set of strings in an equivalence class of derivations is to be maintained, expansions of A into A cannot be allowed because these do not affect the set of strings in the full class". (p. 13)

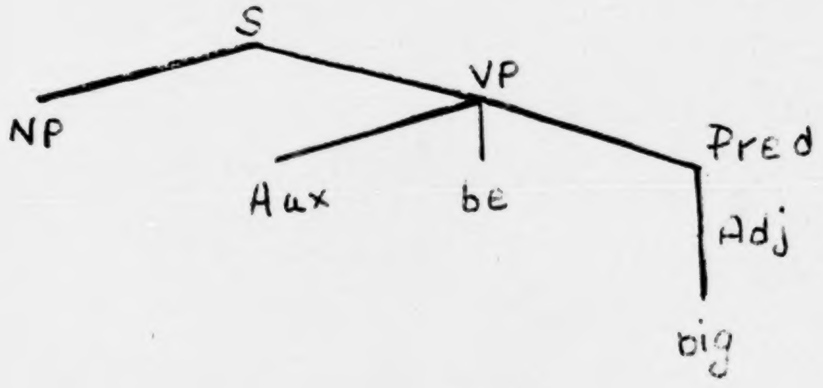
He then adds in footnote 21:

"Furthermore, if condition (2)c is not met there will be an unbounded number of lines possible in the derivation of any string and an infinite number of derivations for any terminal string. This would make the languages enumerated not recursive." (p. 84)

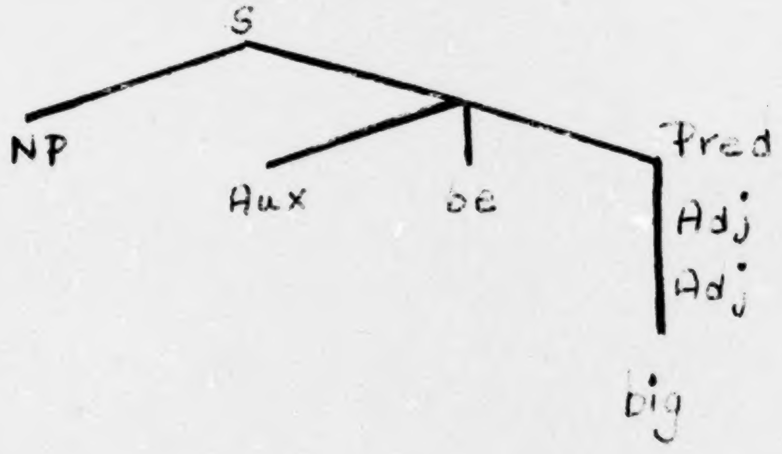
Postal clearly intends to prevent rules such as 4 in the following set.[3]

1. S → NP + VP
2. VP → Aux + be + Pred
3. Pred → Adj
4. Adj → (very) Adj
5. Adj → big, old, ...

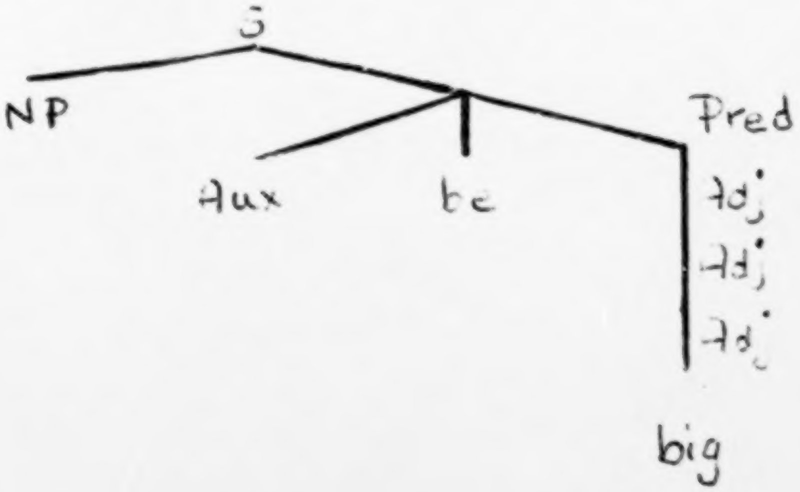
These rules generate the desired sequences, but the trees for any given sequence produced by such rules may be infinite, for rule 4 may be applied an indefinite number of times for any given sequence of words. That is, to produce the sentence He is big one may apply rules 1-3 and 5, and obtain the following tree.



or rules 1-5 may be applied, resulting in



Similarly rules 1-3, 4, 4, and 5:

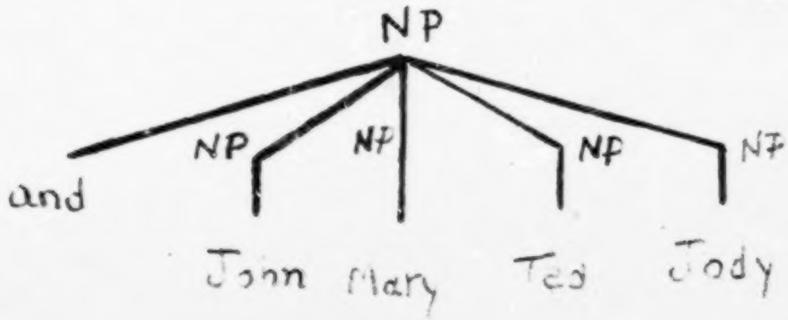


etc. Rule 4 may be applied any number of times (from none to infinity) during the derivation of this sequence, therefore the trees which are produced using this rule are indeterminate. The indeterminacy of trees involving this rule is, in addition, of an uninteresting sort, since it is not relatable to any linguistic ambiguity. That is, we cannot say that the sentence He is big is ambiguous in a way that may be explained by varying the number of nodes labled adjective which dominate big. We must conclude that the indeterminacy of the tree is a result solely of rule 4. Since one of the major purposes of a phrase structure grammar is to assign a tree structure to each sequence producable by the grammar, rules such as 4 are not allowed within the grammar.

Later revisions of transformational grammar loosen Postal's restrictions considerably. Thus in 1966 we find Lakoff and Peters (1969. p. 114) using rule schemata such as

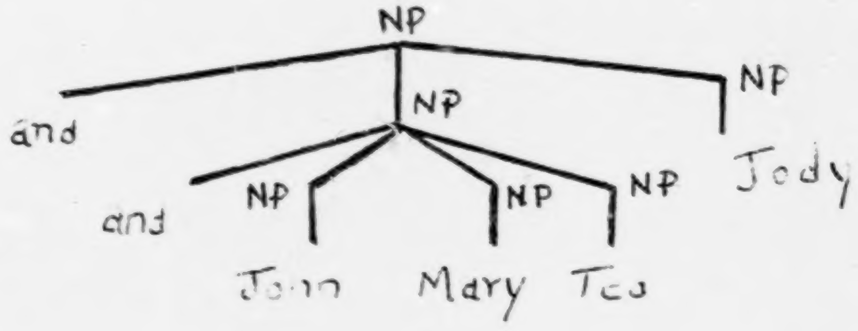
6. $NP \rightarrow$ and $(NP)^n$, $n \geq 2$.

Such rule schemata clearly violate Postal's restrictions in that they introduce NP as a constituent of NP. They do not, however, produce indeterminate trees as rule 4 did above. That is, each different application of rule 5 will correspond to a difference in the tree which, if it does not actually result in different sequences of morphemes, does correlate with actual ambiguities of the sequence. For example, the sequence John and Mary and Ted and Jody may be produced using a) one application of rule 6.[4]

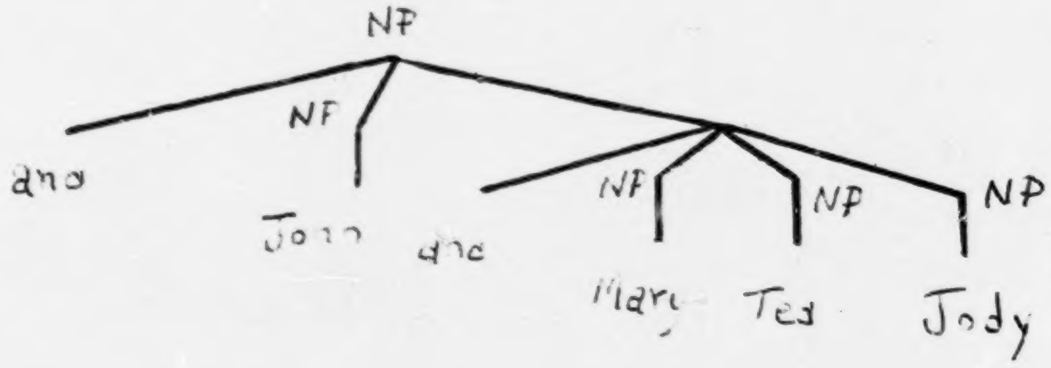

NP
and
NP
NP
NP
NP
John
Mary
Ted
Jody

b) two applications of rule 6

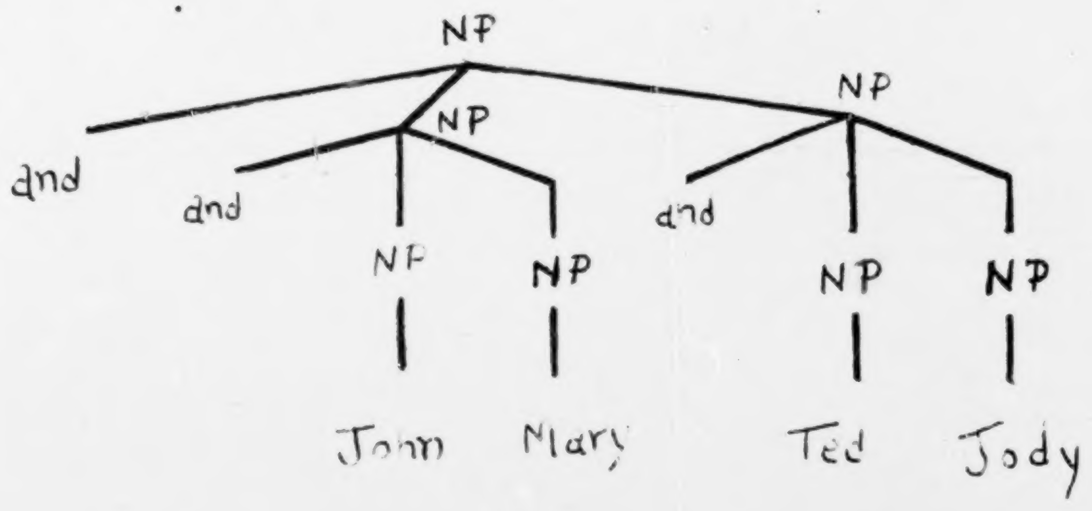
i)


NP
and
NP
NP
and
NP
NP
NP
John
Mary
Ted
Jody

or ii)


NP
and
NP
John
and
NP
NP
NP
Mary
Ted
Jody

or c) three applications of rule 6



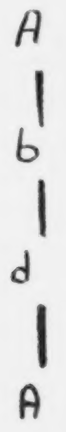
These four trees correspond to four different possible semantic interpretations of the sequence and are therefore necessary to the proper description of that sequence. The status of rule 6 therefore differs significantly from that of rule 4 since the various trees describing any given sequence of morphemes derivable by the applications of rule 4 do not correspond to any ambiguity of the resulting sequence of morphemes. Both rule 4 and rule 6 are recursive rules, but since rule 4 produces vacuously indeterminate trees for all sequences it generates, let us call it (and any rules or systems of rules like it) perniciously recursive.

What characterises a set of perniciously recursive rules? We have already seen one instance in rule 4. In this case pernicious recursion occurs because an Adjective may in some cases be the sole manifestation of an including Adjective. In fact, pernicious recursion results every time a system of rules allows a construction to be realized entirely by another identical construction. That is to say, a system of rules such as the following is perniciously recursive.

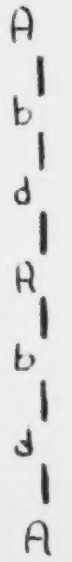
7. A → (a) b
8. b → (c) d
9. d → (e) A

For A may dominate solely A. No matter what other alternative expansions there are for A, it is possible to apply and reapply rules 7-9 any number of times and still result with the same terminal string.

(α)



(β)

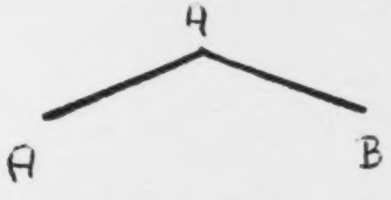


The terminal strings of α and β are identical, yet α results from applying each of the rules 7-9 once, while β results from applying each of the rules 7-9 twice.

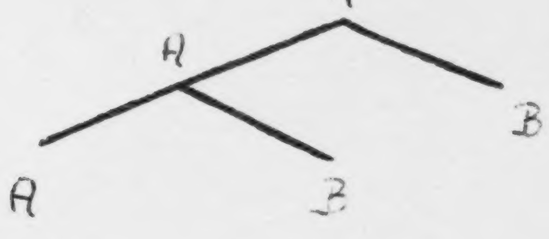
A system of rules is not perniciously recursive as long as a construction may never dominate solely itself. A rule such as 10 is not perniciously recursive, since the strings produced by applying it n times is not identical to the string produced by applying it n + 1 times.

10. $A \rightarrow (A) + B$

Applying rule 10 once results in the tree:



with the resulting string AB. Applying rule 10 twice results in the tree:



with the resulting string A B B. The situation described by rule 10 is exemplified by the recursion involved in the description of English noun phrases like

the boy's father

where the noun phrase the boy's father includes within it another noun phrase, the boy, but this included noun phrase can never be the *sole* manifestation of the including noun phrase since in addition to the determiner tagmeme noun phrase must contain a Head Noun. Note that so long as B is obligatory in rule 10, the rule is not perniciously recursive no matter whether or not A is optional. That is, neither rule 10 nor rule 10 a is perniciously recursive

10 a. $A \rightarrow A + B$

The bad effects of pernicious recursion might be avoided by the use of an ad hoc rule stating that whenever a node labeled A dominates one and only one node also labeled A (the two nodes labeled A may be separated by any number of other non-branching nodes) then the dominating occurrence of A and all intervening nodes are erased, and the lower node A is attached to the tree where the upper node A used to be. On the assumption that a grammar which introduces nodes only to erase them at some later date is not maximally simple, transformational grammarians whenever possible avoid the use of this convention. That is to say, they restrict the systems of rules they use to non-perniciously recursive systems.

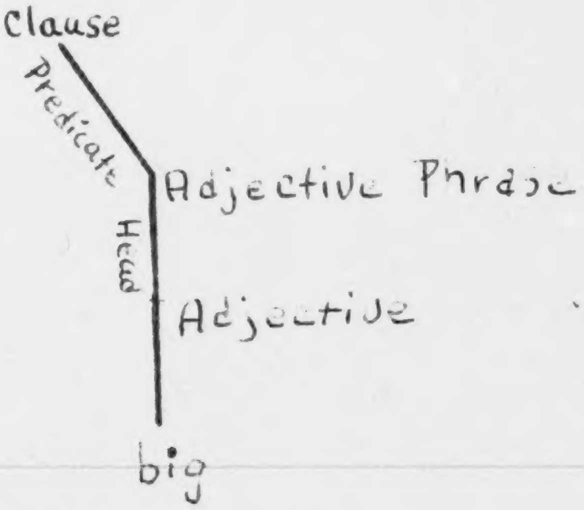
Should tagmemicists also avoid perniciously recursive systems of rules? I believe they should, but there exist certain types of data which may only be described by means of such rules.

We should note first that the overt specification of functional relations does not affect pernicious recursion. That is, rules like rule 4, or rules 7,8, and 9, which allow a given construction to dominate solely itself, will be perniciously recursive no matter what functional relations the various constituents manifest. Thus even if we specify both function and form instead of only form in rule 4, it would still remain a perniciously recursive rule.

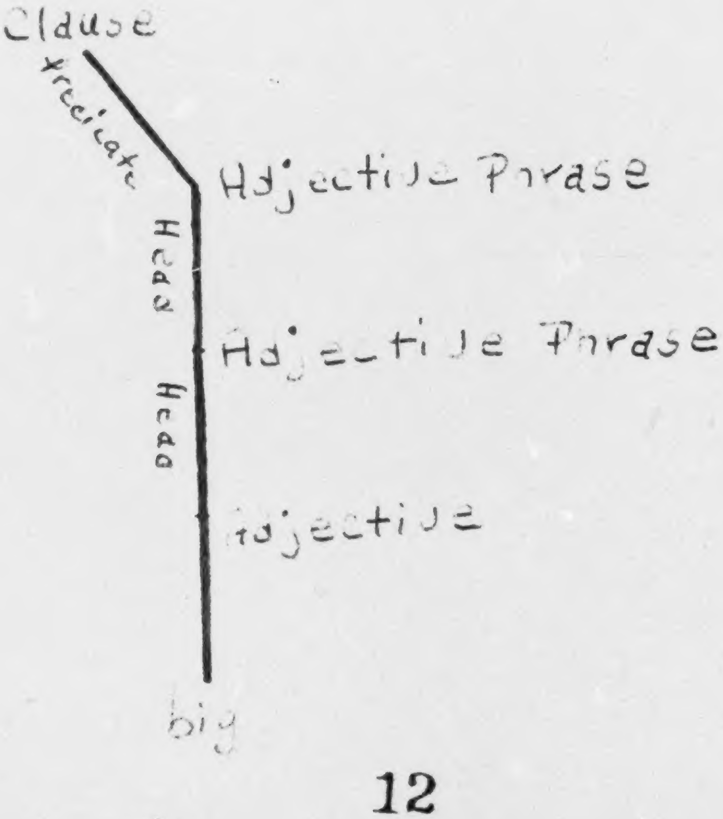
4 a. AP → ± Intensifier: very + Head: AP/adjective

The only difference in the results of the application of rule 4 as against 4 a lies in the overt specification of the functional relations: both 4 and 4 a specify an infinite number of trees for any given sequence of intensifier and adjective. e.g.

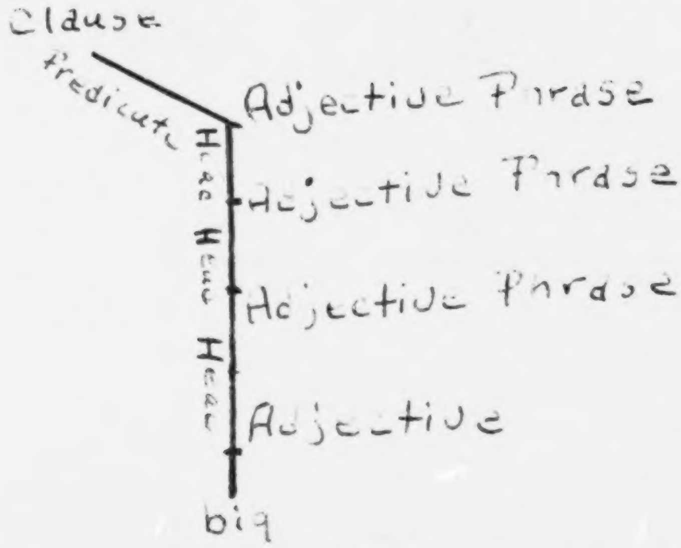
(applying rule 4 a once)


Clause
Predicate
Adjective Phrase
Head
Adjective
big

(applying rule 4 a twice)


Clause
Predicate
Adjective Phrase
Head
Adjective Phrase
Head
Adjective
big

(applying rule 4 a three times)



etc. This analysis of adjective phrases can be objected to on a number of grounds, however, one of the major ones being that it assigns the wrong structure to these sequences,[5] thus we cannot use a rule such as 4 a to illustrate the necessity for perniciously recursive systems of rules. Constructions do exist, however, which require perniciously recursive systems of rules for their description. These occur in the nominal modifiers within the noun phrase in English. English has many noun-noun constructions such as rubber boat, canoe carrier, and Viking carvings of human heads.[6] These constructions include not only examples involving a single noun modifying a head noun, they also may involve groups of words, constructions, whose head is a noun: e.g. its great five story face (of a radio telescope), an apple corer handle, the twelve inch record shelf (shelf for twelve inch records), the men's shoes department head, the MacMillan modern Spanish Literature Series, etc. The description of these constructions entails the setting up of a construction type, nominal phrase, which may be a constituent of a noun phrase. Thus the noun phrase formula (with only a partial list of potential filler classes) is:

Noun Phrase = ± Limiter ⟨ only ⟩ ± Determiner 1 ⟨ all ⟩

± Determiner 2: article/genitive phrase ± Determiner 3: cardinal numerals ± Loose Knit Modifier: Adjective ± Close Knit Modifier: Nominal Phrase + Head: noun ± Restrictive Modifier: relative clause ± Non-Restrictive Modifier: relative clause

A first approximation to the nominal phrase formula is: Nominal Phrase = ± Determiner 3: cardinal numeral ± Loose Knit Modifier: Adjective ± Close Knit Modifier: Nominal Phrase + Head: noun

Nominal phrases differ from noun Phrases in that they may not have Determiner 1 or Determiner 2 tagmemes nor the Restrictive or the Non-Restrictive Modifier tagmemes,[7] so that none of the following sequences are grammatical.

*a big the apple corer handle
*an old my record shelf
*an old all men's quartet
*a University that was recently founded faculty

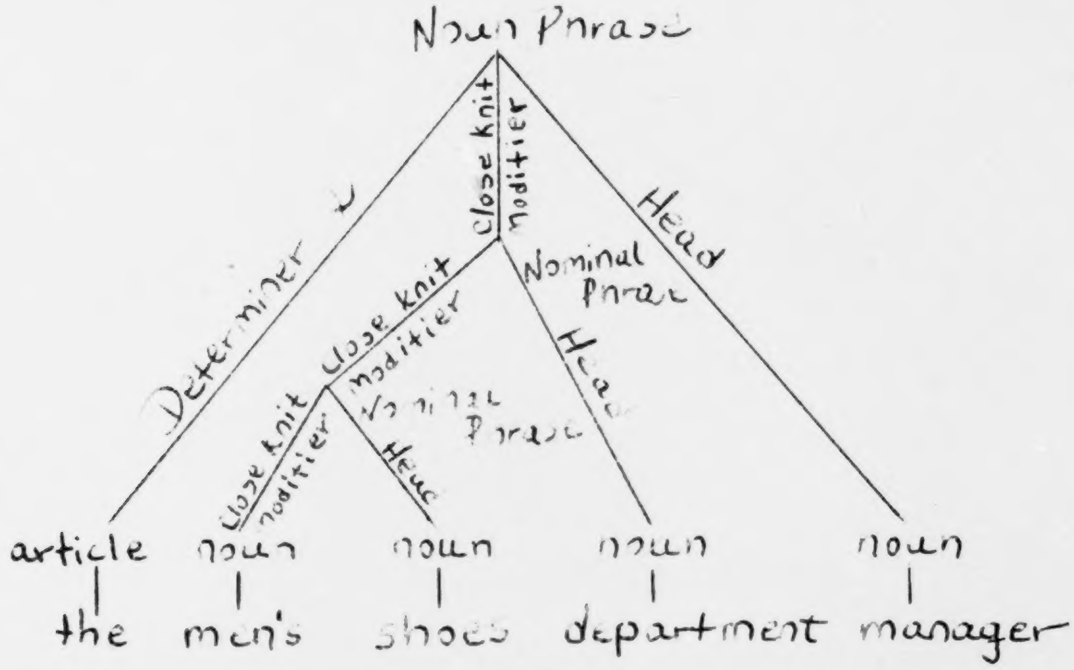
The two formulas just given account for constructions such as:

the men's shoes department manager
the tree surgeons" association president
an apple corer handle maker

The following paraphrases[8] show that these are all left branching constructions (some of the sequences marked with * may be grammatical, but they are never paraphrases of the original construction)

the manager of the men's shoes department
*the department manager of the men's shoes
the manager of the department {of} men's shoes
{for}
*the manager of the shoes department of men's
the manager of the department {with} shoes for men
{selling}

The constituent structure tree produced by the formulas for this example would be:


Noun Phrase
Determiner
Close Knit Modifier
Head
Nominal Phrase
Loose Knit Modifier
Close Knit Modifier
Nominal Phrase
Head
Close Knit Modifier
Head
article
noun
noun
noun
noun
the
men's
shoes
department
manager

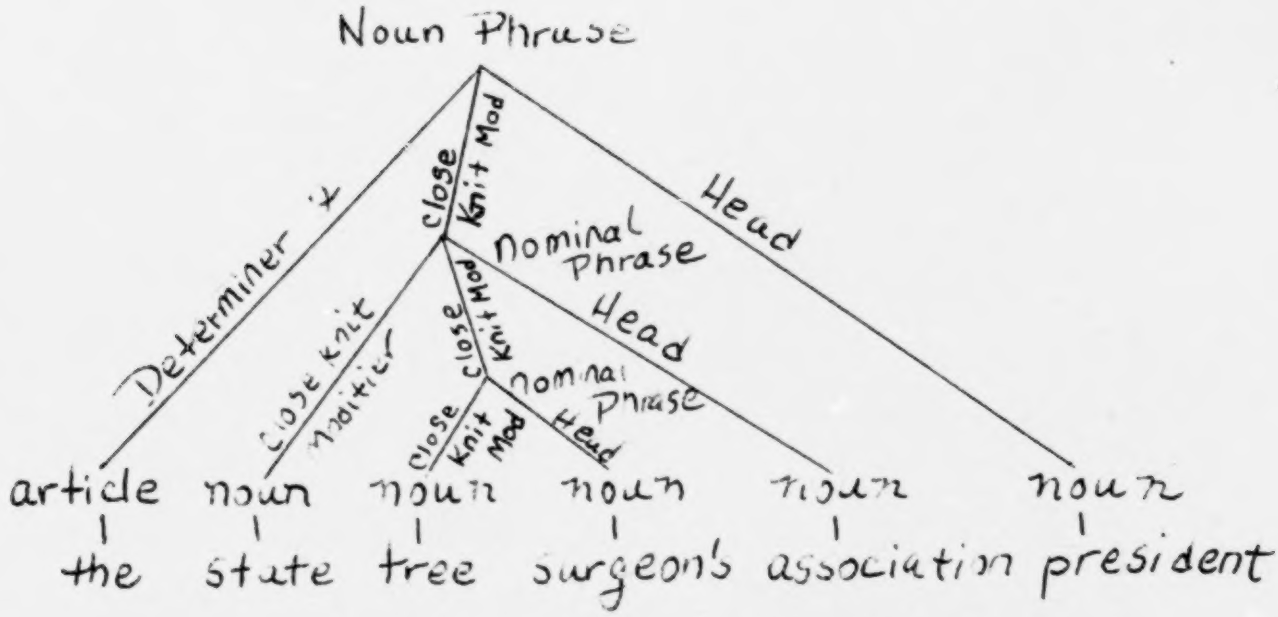
Once it is made clear that the Loose Knit Modifier and Close Knit Modifier tagmemes of the noun phrase and the nominal phrase are repeatable, a number of other constructions may be described by these formulae. e.g.

state tree surgeons association president
a walnut long playing record cabinet sale
an oak apple corer handle maker

The grammaticality of the two phrases marked with braces in the following set of paraphrases shows that the noun phrases above contain a nominal phrase with two occurrences of the Close Knit Modifier tagmeme within it.

the president of the state tree surgeons association
*the association president of the state tree surgeons
the president of the state association of tree surgeons
the president of the tree surgeons association of the state

The constituent structure produced by the formulas for this example would be:


Noun Phrase
Determiner 2
Close Knit Mod
Head
Nominal Phrase
Close Knit Modifier
Close Knit Mod
Head
Nominal Phrase
Close Knit Mod
Head
article
noun
noun
noun
noun
noun
the
state
tree
surgeon's
association
president

There are a few examples, however, which cannot be described by the rules as currently stated. These examples all involve right branching; that is, in each case the noun phrase contains a nominal phrase which itself contains as its head a nominal phrase (not a noun).

the school admissions policy committee

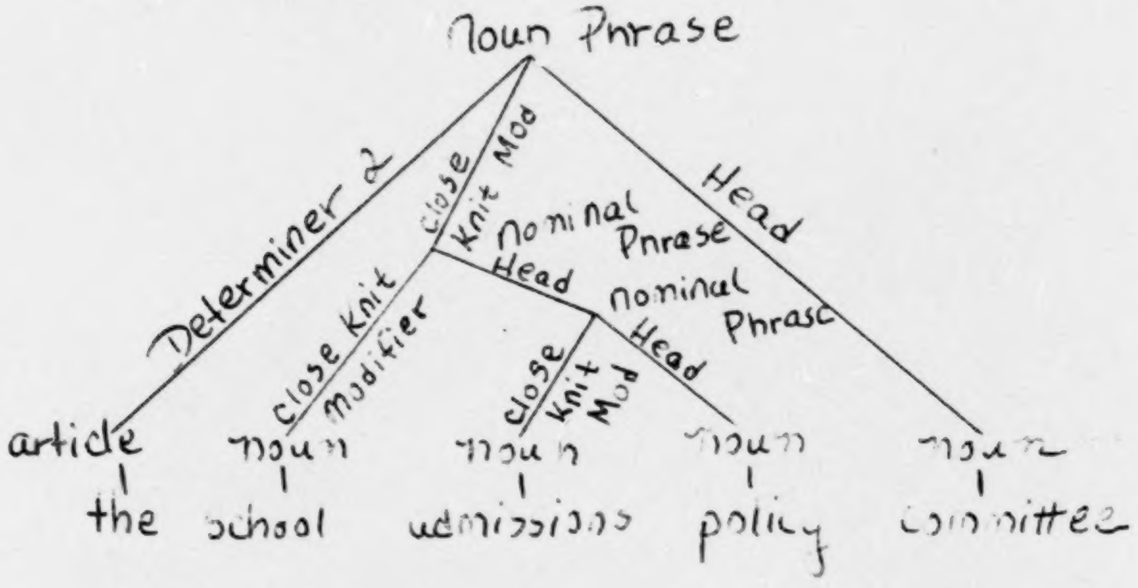
the committee for (forming) the school admissions policy

*the policy committee for school admissions

*the committee for (forming) the policy for school admissions

the committee for (forming) the admissions policy for the school

The tree for this phrase must be as follows:


Noun Phrase
Determiner 2
Close Knit Mod
Head
Nominal Phrase
Close Knit Modifier
Head
Nominal Phrase
Close Knit Mod
Head
article
noun
noun
noun
noun
the
school
admissions
policy
committee

Because the nominal phrase *school admissions policy* in this construction contains as its head the nominal phrase *admissions policy*, the formula given above for the nominal phrase will have to be revised to read:[9]

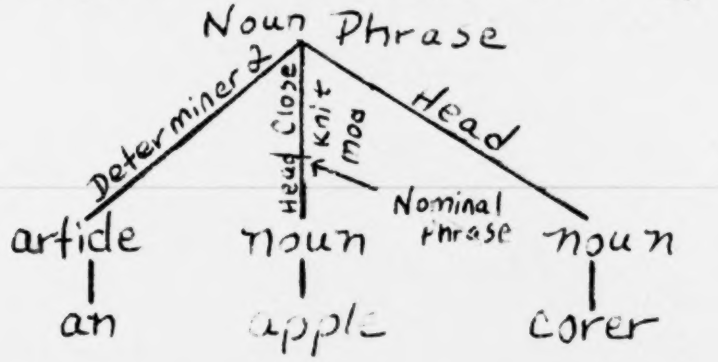
Nominal Phrase = ± Determiner 3: cardinal numeral ± Loose Knit Modifier: Adjective ± Close Knit Modifier: nominal phrase/noun + Head: nominal phrase/noun

But this formula is perniciously recursive, since all tagmemes other than the head are optional; thus a nominal phrase node may directly dominate a nominal phrase node with no other branches coming from the dominating node. In this case, however, we encounter an added difficulty; the two alternate fillers of the head tagmeme are emically the same construction. That is to say, a minimal nominal phrase is a noun. The phrases *a record cabinet maker* and *a cabinet maker* differ only in that the first contains a slightly expanded nominal phrase (*record cabinet*) while the second contains a minimal nominal phrase (*cabinet*). Since only emically contrasting construction types may be listed as alternative fillers of a tagmeme, and since a minimal nominal phrase is a noun, the expanded and minimal forms of the nominal phrase should be treated as emically the same: both should be called nominal phrases. (This is analogous to saying that both *old* and *very old* are adjective phrases.) This means that the formula for the nominal phrase ought to be:

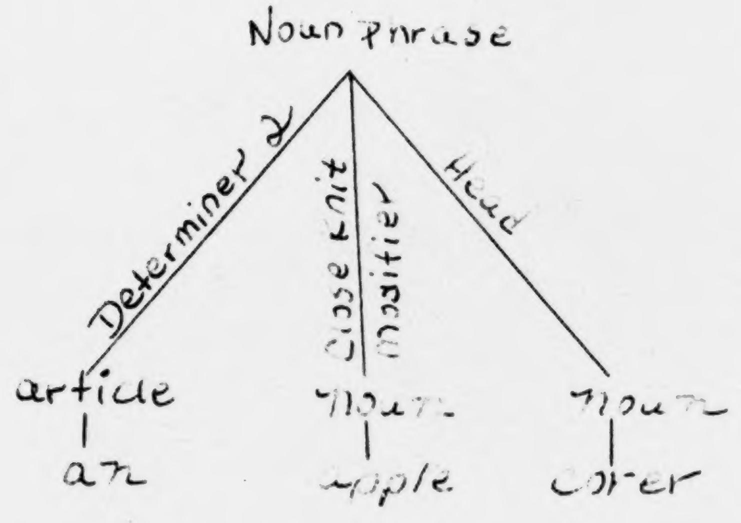
Nominal Phrase = ± Determiner 3: cardinal numeral ± Loose Knit Modifier: Adjective ± Close Knit Modifier: nominal phrase + Head: nominal phrase

But this introduces pernicious recursion with a vengeance, for there is now no way whatever to exit form this rule. Since the head tagmeme of the nominal phrase is obligatory and filled *only* by nominal phrase, and the head of that nominal phrase is likewise filled only by a nominal phrase, etc., the tree of any construction containing a nominal phrase is not merely indeterminate, but *necessarily* infinite. The convention proposed earlier (p. 8), the deletion of nodes introduced through pernicious recursion, is little help here, since there is no way of exiting from the circle even if we can limit the number of nodes in the tree. The question is no longer, can we describe the Englsih nominal phrase without using systems which involve perniciously recursive rules (thus making necessary the use of the node deleting convention) but rather can these nominal phrases be described at all? Let us rephrase this in more concrete terms. Given the noun phrase, *an apple corer*, what is the proper structure to be assigned to it? Should it be a) or b)?

(a)


Noun Phrase
Determiner 2
Head Close Knit Mod
Head
Nominal Phrase
article
noun
noun
an
apple
corer

(b)


Noun Phrase
Determiner 2
Close Knit Modifier
Head
article
noun
noun
an
apple
corer

The implications of solution (a) are: (1) the grammar contains a circular rule which obligatorily produces infinite trees (2) it is claimed that a minimal nominal phrase is a noun; thus the difference between a record cabinet and a twelve inch record cabinet does not lie in the type of syntagmeme which manifests the Close Knit Modifier tagmeme of the noun phrase but in the particular variant of the syntagmeme chosen (3) nominal phrases may be realized by single nouns. Thus no artifical restrictions as to minimal length of nominal phrases need be imposed (compare 3 under solution b) and (4) nominal phrases may occur as potential fillers of the Close Knit Modifier or head tagmemes of the noun phrase or nominal phrase. (Nouns may not so occur: all single nouns occurring in these positions will be analyzed as minimal nominal phrases.)

The implications of (b) are (1) we avoid the problem of a circular rule producing necessarily infinite trees (2) noun contrasts with nominal phrase as a possible filler of the Close Knit Modifier tagmeme, thus the fillers of the Close Knit Modifier tagmeme of the following noun phrases are realizations of different syntagmemes.

Determiner 2	Close Knit Modifier	Head
a	record (noun)	cabinet
a	twelve inch record (nominal phrase)	cabinet

(3) nominal phrases must have more than one tagmeme present. That is, at least one of the optional tagmemes must be present, or, if none is, the head must be filled by a nominal phrase which contains at least one optional tagmeme. (Otherwise the result will be a single noun, which we have said belongs to a contrasting syntagmeme) and finally (4) because we find phrases such as the university chemistry club, the school admissions policy (in which the constructions chemistry club, and

admissions policy are modified by the and university and the and school respectively) one possible filler of the head tagmeme of the noun phrase must be a nominal phrase. In this position it again contrasts with nouns.

We are thus left with a dilemma: Neither solution (a) nor solution (b) is wholly satisfactory. Solution (b) seems to avoid theoretical inconsistency but provides a counter-intuitive analysis of points (2) and (3). Solution (a) is untenable because of its circularity, yet it provides intuitively satisfying answers to points (2) and (3).

To summarize, we began by exploring the implications of the properties of certain recursive rules and found a) that no completely coherent system of rules could allow perniciously recursive rules, and b) that certain constructions of English can only be described using perniciously recursive rules.

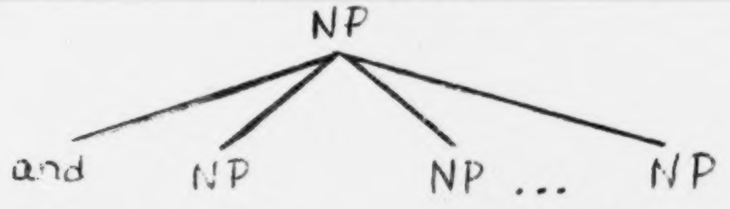
Footnotes

1. I would like to thank Kenneth Pike and Bruce Stark for their criticisms of an earlier version of this paper. Though they did not always agree with my argument, their comments were most helpful.

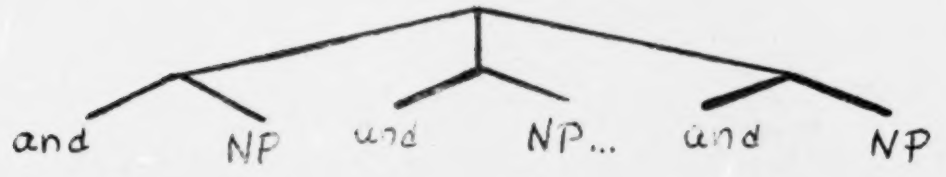
2. Note that my definition of recursion is not the same as Longacre's (1965). For me, any system of rules in which a unit occurs to the left of a rewrite symbol and later to the right of a rewrite symbol in such a way that the system of rules generates an infinite number of sequences, and also infinitely long sequences, is a recursive system of rules. For Longacre, recursion is more intimately tied to the notion of hierarchy. A system of rules which rewrites a sentence as part of a sentence, a clause as part of a clause, etc. is a recursive system. This concept of recursion differs from mine in that (1) a recursive system in Longacre's sense is not _necessarily_ infinite. (Usually such cases do involve infinite systems, however). (2) Longacre would not say that a clause playing a role within a phrase constitutes recursion. He would call it "back looping." My use of the term makes no distinction as to the level of relevance of the included constituent.

3. These rules are excerpted from Chomsky (1962). While at no time were the rules in that grammar presented as a definitive proposal for the description of English, the fact that he uses rule 4 illustrates that the temptation to use such rules is real.

4. The form of this rule assumes a general principle which transforms a tree of the form

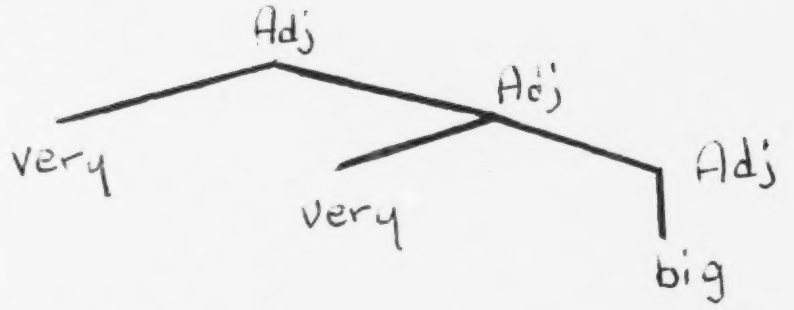


to

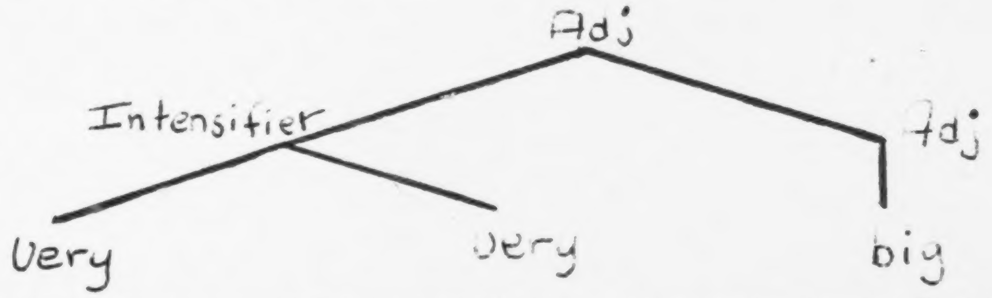


Later transformational rules may delete certain of the conjunctions. (see Lakoff and Peters, 1966 fn. 2). These readjustments and deletions do not affect the recursiveness of the rule and therefore will be ignored.

5. Rather than



which would be assigned by 4, the structure should be



Note for example that the two occurrences of *very* are not independent, for if we expand the number of intensifiers considered to include *rather* and *awfully* we find that a) only repetations of the same word may be used: *very very big*, and *awfully awfully big*, but **very awfully big* and **awfully very big*. b) Only certain intensifiers may be so repeated: e.g. **rather rather big*. A more informal bit of evidence in support of the second parsing of *very very big* lies in the semantic interpretation of the sequence. It seems counter-intuitive to say that the first *very* intensifies *very big*, but rather that *very very* is an extra strong intensification of *big*.

6. I am not considering here compound words such as *bookshelf*, *doghouse*, *birdhouse*, and *apple pie*, but true sequences of words. Almost any of the words cited above *could* be interpreted as syntatic constructions. e.g. *book shelf* (as opposed to *record shelf*) *dog house* (house for dogs rather than a type of house) etc. The constructional interpretation rather than the unitary interpretation interests me here. Often the two interpretations are signalled by a difference in stress pattern. e.g. *bóokshèlf*, *bôok shélf*, (for other formal signals see Joey, J. van, 1964)

7. Recent discussions have thrown doubt on whether the nominal phrase is to be considered truely distinct from the noun phrase, since it contains solely a sub-set of the tagmemes which are contained in the noun phrase. Thus, given a sequence such as *radar installation*, one cannot tell whether it is a noun phrase or a nominal phrase unless he can find it in contexts such as *the cost of radar installation contributes 10 per cent of the price* or *a radar installation supervisor*. If the two con-

structions are to be considered variants of the same construction type the nominal phrase will merely be considered a restricted noun phrase, (Restricted both in the possible expansions it may accept, and in its distribution). The decision as to the status of the nominal phrase will not, however, affect the basic argument about recursion which is presented here, though it may necessitate some rephrasing of that argument.

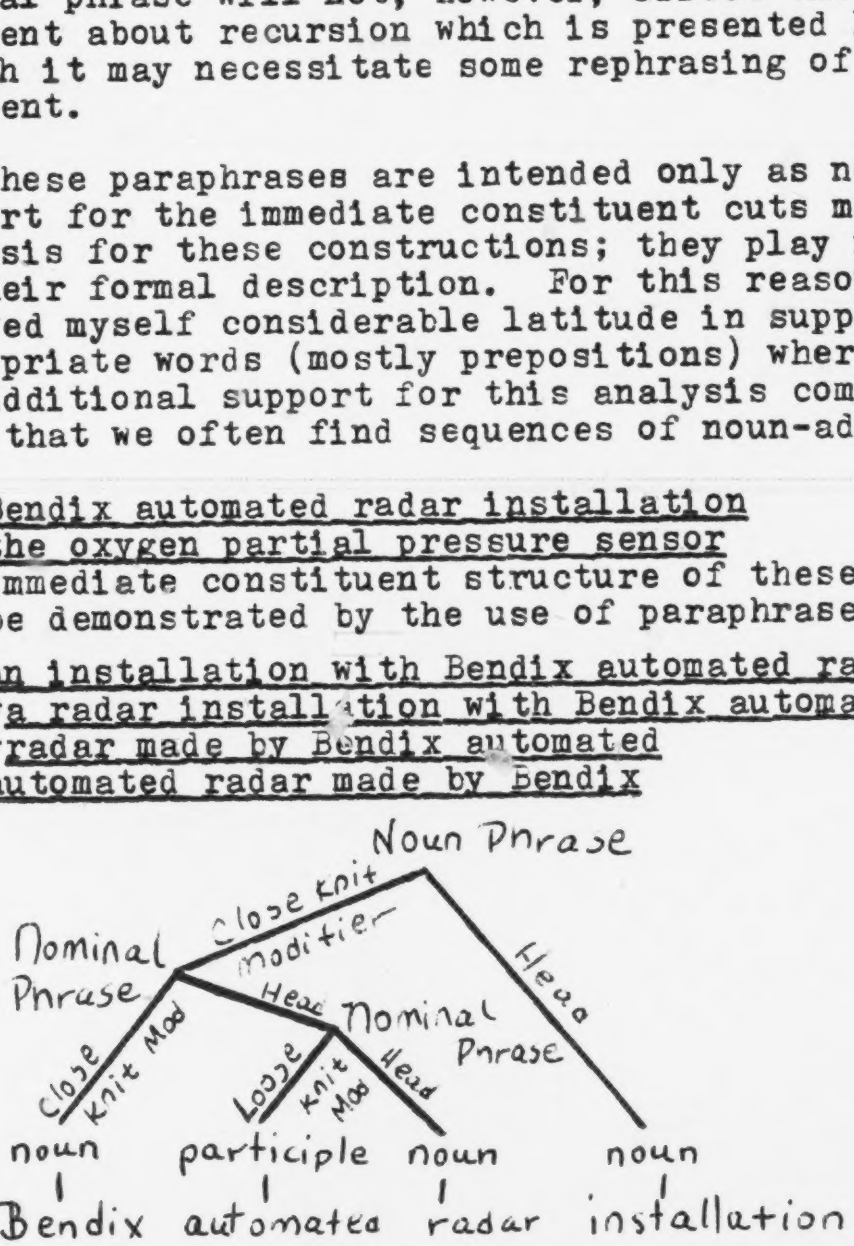
8. These paraphrases are intended only as non-formal support for the immediate constituent cuts made in my analysis for these constructions; they play no role in their formal description. For this reason I have allowed myself considerable latitude in supplying appropriate words (mostly prepositions) where useful.

9. Additional support for this analysis comes from the fact that we often find sequences of noun-adjective-noun. e.g.

Bendix automated radar installation
the oxygen partial pressure sensor

The immediate constituent structure of these constructions can be demonstrated by the use of paraphrases:

an installation with Bendix automated radar
*a radar installation with Bendix automated
*radar made by Bendix automated
automated radar made by Bendix


Noun Phrase
Close Knit Modifier
Head
Nominal Phrase
Close Knit Mod
Head
Nominal Phrase
Loose Knit Mod
Head
noun
participle
noun
noun
Bendix
automated
radar
installation

Normally adjectives and participles occur only before nouns since the Loose Knit Modifier tagmeme occurs before the Close Knit Modifier tagmeme. But if a nominal phrase may be a head of a nominal phrase, the included nominal phrase may contain a Loose Knit or Close Knit Modifier tagmeme of the including nominal phrase.

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The Bloomfieldian Model

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0. Introduction

From a common sense point of view most people would agree that languages consist of sounds, words, sentences, and meanings. And even though linguists tend to be uncomfortable with these everyday terms, it is nevertheless true that a theory of linguistics defines itself by the particular way in which it handles sounds, words, sentences, and meanings. The conceptual machinery that a theory sets up to represent these things not only defines the overall design of the machinery itself but also shapes our view of the objects that it deals with: a language looks very different depending upon which linguists you talk to, just as Shakespeare's Hamlet looks very different depending upon which critics you read.

There are many terms for conceptual machinery but a convenient and current one is "model," which I use in the non-technical sense defined by Zellig Harris as follows: "One can speak of a linguistic model, in an untechnical sense, as any framework in respect to which language is described, or any picture of how the linguistic system works. In this sense, a particular style of grammar-making is a model of language structure" (1959:27). In the United

States it is possible to distinguish three theoretical models that have had their moments in the scientific study of language. They are the Pre-Bloomfieldian models of Franz Boas and Edward Sapir, the model worked out by Leonard Bloomfield and his successors which dominated American linguistic thinking from 1926 to 1957, and the Transformational model that surfaced in 1957 with the publication of Noam Chomsky's Syntactic Structures and still holds sway. Although the Bloomfieldian model does not currently hold the linguistic limelight, I believe that its theoretical foundations are worth investigating for several reasons.

First of all, it is there. Unlike Transformational theory, which is in a state of continual flux and still partly underground, Bloomfieldian theory stabilized into a body of doctrine that is in the public domain and available, therefore, for scrutiny. Even though Bloomfieldian theory has been above ground for some time, its basic notions have not to my knowledge been gathered together into one place for critical examination: there are bits and pieces of history, programmatic statements, and scattered insights to be found in reviews and at the beginnings and ends of articles, but they have never been brought together and discussed.[1] Another justification for examining Bloomfieldian is that it is now becoming more and more apparent that Syntactic Structures was not as sharp a break with the Bloomfieldian past as it first appeared to be. In the eyes of George Lakoff, at least, "early transformational grammar was a natural outgrowth of American structural linguistics, since it was concerned primarily with discovering the regularities governing the distribution of surface forms" (1969:35). If Lakoff is right, it would seem that Bloomfieldian theory is that hidden but very important nine-tenths of our linguistic present that deserves our serious and unbiased attention if we are to understand it. In other words, I do not intend in this critical examination to exorcise the spirit of linguistics past with the magic formula "the inadequacies of phrase structure grammar" nor to make a "projection backwards of certain ideas of contemporary interest," but will attempt instead to present an objective and systematic interpretation of the Bloomfieldian model on its own terms and for its own interest.

In particular, I would like to do the following three things: (1) delineate the scope of Bloomfieldian theory by determining what is included within and excluded from the Bloomfieldian notion of "structure"; (2) define the properties of the model's basic elements and relations; and (3) determine as clearly as possible the Bloomfieldians' attitude toward meaning.

Before embarking upon this ambitious programm, let me state more explicitly the matter and method of my discussion. This account of "structure" and "meaning" will consider the values given these terms by Leonard Bloomfield in his principal works and by those men who consider themselves his intellectual heirs.[2] A partial roster of their names appears in a collection of essays edited by Martin Joos called Readings in Linguistics: The Development of Descriptive Linguistics in America since 1925 (referred to hereafter as "Joos 1957"). The most important men for my study are Charles Hockett, Bernard Bloch, and Zellig Harris. Hockett's formulations appear most frequently because, according to Joos, the task of codifying Bloomfield's ideas "was taken on by--indeed, in a way it was assigned to--the youngest of the persons spoken of, Bloomfield's disciple C. F. Hockett" (Joos 1957:96).[3] My term "Bloomfieldians," should not imply that these men are mindless carriers of an inflexible dogma. Quite the contrary, Hockett is as much an innovator as a codifier; Harris is known for a "hocus-pocus" bent that is distinctly non-Bloomfieldian; and Bernard Bloch, probably the truest Bloomfieldian of them all, reshaped Bloomfield's doctrine in many fundamental ways. These men are Bloomfieldians in the sense that they all certainly believed what Bloch so ably said:

> There can be no doubt that Bloomfield's greatest contribution to the study of language was to make a science of it. Others before him had worked scientifically in linguistics; but no one had so uncompromisingly rejected all prescientific methods, of had been so consistently careful, in writing about language, to use terms that would imply no tacit reliance on factors beyond the range of observation. (1949:92)

Bloch's last clause is particularly important because, as I shall try to show, it is the fundamental assumption that underlies all the other notions of the Bloomfieldian model.

We shall begin by looking at what is included within the Bloomfieldian notion of structure and then go on to examine the particular ways in which sounds, words, and sentences are represented as structures within the model.

1. Scope

Leonard Bloomfield's concern with factors that all investigators could perceive and handle put American structuralism on a firm empirical basis, but limited its scope in several important ways. It caused the Bloomfieldians to reject an important dimension of linguistic organization, paradigmatic relations, that most other theories accept without qualm. For, unlike most British and European theories, American structuralism focussed on syntagmatic relations, linear sequences of formal units, to the almost complete exclusion of paradigmatic relations, systems of units based upon shared features of either phonetic or semantic substance. This point has been made before but Samuel Levin put it particularly well when he noted that

> Linguistic analysis distinguishes two planes of language--the syntagmatic and the paradigmatic--and, although it is customary in American linguistics to treat the syntagmatic plane as somehow the more important of the two--inasmuch as presumably it exists as such and is therefore open to inspection, it would be a mistake to believe that it is any more important to the linguistic act than the paradigmatic plane; it is simply more amenable to analysis. (1962:19)

Because the syntagmatic plane is "open to inspection," it is a factor within the range of observation and therefore became the almost exclusive focus of Bloomfieldian attention (see, also, Martinet 1953:584).

The Bloomfieldian emphasis on syntagmatic relations begins with the phoneme, the basic unit of sound, and continues into increasingly larger, but not more complex, units of linguistic form. To be specific, a typical Bloomfieldian description (1) establishes the phonemes, and then (2) states the occurrences of phonemes within morphemes, (3) of morphemes within words, and (4) of words within constructions and finally, (5) of constructions within sentences. At the sentence, however, the analysis breaks off sharply, for there was assumed to be no constructions, i.e. structures, beyond a single sentence, as a result, no allowance was made for the analysis of discourse. The layering of smaller units within larger ones is called the "hierarchial structure" of language and each layer is called a "level"; thus, (1) is called the phonemic level or phonemics, (2,3) the morphemic level or morphemics, and (4,5) the syntactical level. In addition to describing the ways in which morphemes combine to form words, one could also list each one separately in a "lexicon," but such a listing was not generally taken to be a "level" of structure.

As for the relations that held between this hierarchy of units, the Bloomfieldian emphasis was much more on horizontal intra-level relations than on vertical inter-level relations; upon, that is, the arrangements of units relative to each other in sequential order within one level.

The characteristic occurrence of a particular unit was called its "distribution"; the typical patterns of occurrence of units within a level was called their "tactics." Thus, the permitted occurring patterns of phonemes were called their "phono-tactics" and the occurring patterns of morphemes "morpho-tactics"; the occurring patterns of constructions had no parallel term but turned on the basic relation "constituency" which shall be discussed in detail below.

The principal vertical relationship was "made up of" or "composed of"; that is, a sentence was composed of constructions, constructions were made up of words, words were made up of morphemes, and morphemes were composed of phonemes. Because smaller units "composed" larger ones, the fundamental difference between the units of different levels was the simple quantitative one of "size": morphemes were simply bigger than phonemes. The units of these levels fitted together to give an extremely homogeneous if somewhat monolithic description that consisted of just two basic parts: (1) an inventory of units and (2) their tactic patterns or arrangements. Very schematically, the overall picture of language structure that these Bloomfieldian assumptions yield looks like this:

		Units	Relations	Levels
1. meanings	:	-	-	-
2. sentences	:	constructions	constituency	Syntax
3. words	:	morphemes	morpho-tactics	Morphemics
4. sounds	:	phonemes	phono-tactics	Phonemics

In addition to showing what is within the pale of structure, the chart also indicates what is without. The largest unit is a single sentence (composed of constructions), anything longer is, by definition, excluded as not structure; at the bottom the smallest units are the phonemes which were assumed to be the "basic building blocks" of language so that structure did not extend beyond them. In between these two limits were the formal units bound together by the two basic relations "composed of" and sequential ordering. As we shall see, meaning was excluded from the Bloomfieldian notion of structure because it was assumed to be outside of language. In sum, the scope of the Bloomfieldian model was defined at the largest size level by a single sentence and at the smallest size level by strings of phonemes; in between was "structure." Beyond the sentence and below the phonemes there was no structure, only semantic and phonetic data.

With the limits of the model defined and some of its basic notions briefly mentioned, we are now ready to examine more closely the formal properties of the particular units that characterized each of the levels. Following the usual Bloomfieldian format, we shall begin with the smallest size level, phonemics, and work up to the largest one, syntax. (On the development of this format see, Hall 1951: 113-14.)

2. The Bloomfieldian representation of sounds: Phonemics

The upper limit of structure was a single sentence completely isolated from its linguistic and cultural context; the lower limit was the indivisible phonemic segments. Because the phonemes were conceived to be the ultimate "building blocks" of language, "anything SUBPHONEMIC was linguistically irrelevant," as Hockett puts it and then adds that "not only his writings but also his conversations with colleagues and students revealed Bloomfield as perhaps more insistent on this point than anyone else. It was a matter of basic principle with him" (1965:195 and note 23).

This is certainly so, but Bloomfield phrased his basic principle in such a way that it was extremely difficult for others to understand.[4] For example, in his "Postulates" Bloomfield stated that "A minimum same of vocal features is a phoneme or distinctive sound" (1926:157). But this is confusing because the phrase "vocal features" usually refers to subphonemic bits of phonetic substance. In spite of his wording, it is clear from the example "As, for instance English [b, s, t]," that Bloomfield means formal units by "vocal features" and not such phonetic features as "labial, stop, fricative," etc.

Bloomfield does much the same thing in Language when he gives the ambiguous definition "a minimum unit of distinctive sound-feature" but then supplies an unambiguous example: "Thus we say that the word pin consists of three phonemes: the first of these occurs also in pet, pack, push, and many other words; the second also in fig, hit, miss, and many other words; the third also in tan, run, hen, and many other words" (1933:79). Thus, it is clear from his examples that for Bloomfield the term "feature" meant an indivisible sound unit and not a subphonemic bit of sound substance as it does for most of us today. Bloomfield's phoneme, which became the Bloomfieldians' phoneme, was not a bundle of sound features but an empty formal unit of "signaling" whose only function was to distinguish lexical forms from one another: it was a shape that had a distribution but no substance. Bloomfield put it this way "The importance of a phoneme, then, lies not in the actual configuration of its sound-waves, but merely in the difference between this configuration and the configurations of all the other phonemes in the same language" (128).

As for the particular relations that held between these basic units of signaling, Bloomfield's definitions are somewhat misleading in his "Postulates" but become clearer in his later work. In the "Postulates" he states that "The orders which occur are the sound-patterns of the language. As, English word-initial [st-] but never [ts-] (157). The term "sound-pattern" was misleading in 1926, when the "Postulates" were published, because it had been used by Edward Sapir just the year before to mean something quite different. To Sapir "sound-pattern" meant "the inner configuration of the sound system of a language, the intuitive 'placing' of the sounds with reference to one another" (1925; Joos 1957:20), a definition whose meutalistic notions "inner configuration" and "intuitive placing" could not have been more alien to Bloomfield's way of thinking about language.

Bloomfield does not attack Sapir's conception of sound pattern directly but makes his attitude toward it quite clear.

After considering a table of phonemes arrayed according to their shared phonetic features, a sound-pattern in Sapir's sense of the term, Bloomfield concludes that "Tables like these, even when they exclude non-distinctive features are nevertheless irrelevant to the structure of the language, because they group the phonemes according to _the linguist's notion of their physiologic character_, and not according to the parts which the several phonemes play in the working of the language" (1933:129-130; emphasis mine). In other words, Bloomfield rejects paradigmatic interrelationships of shared features as being a mentalistic construct of the analyst ("The linguist's notion") and, hence, not "_in_ the working of the language" itself.

As for the actual "parts which the several phonemes play" in the language, Bloomfield explains this by setting up his own table that classifies the phonemes according to their distribution within larger phonological units such as syllables (130). He is not completely satisfied with this, however, and goes on to say that "Since every utterance contains by definition, at least one syllabic phoneme, the simplest way to describe the phonetic structure of a language is to state which non-syllabic phonemes or groups of non-syllabic phonemes (clusters) appear in the three possible positions: _initial_,...; _final_,...; and _medial_,..." (131). Thus, Bloomfield quite clearly conceives of phonological structure in terms of the arrangement of units (phonemes) in a linear sequence of positions (initial, medial, final). This bias toward linear sequences was stated most clearly in his monograph *Linguistic Aspects of Science* where he declares that "For the most part, the phonemes appear in utterance in a linear order. Where this is not the case, the arrangement is so simple that we can easily put our description into linear order" (1939: 23). The arrangement of phonemes in linear orders came to be called "tactic patterns" or "phonotactics" and is quite clearly syntagmatic rather than paradigmatic in nature.

That Bloomfield's syntagmatic and formal notions of phonemes and phonemic structure swept away Sapir's mentalist and paradigmatic conception of "sound-patterns" is indicated by the virtual absence of phonological paradigms from Bloomfieldian descriptions of particular languages and by the downgrading of phonetic substance to "pre-linguistic data" or "phonetic habits."[5] In sum, then, Bloomfieldian phonology was based upon a unit that had a shape but no substance (it was "formal"), that had only syntagmatic relations (tactical patterns), and that had limited patterns of distribution that kept forms (for Bloomfield) or utterances (for the Bloomfieldians) apart.[6] Subphonemic features of sound substance, more sequencial relations, and para-digmatic relations were excluded from Bloomfieldian phonemics because they all required "reliance on factors beyond the range of observation," and were not, therefore, simple abstractions from the observable stream of speech, i.e. not elements that "OCCUR as people speak" (Hockett 1961:50). A second kind of element that occurs as people speak are the units composed of these phonemic building-blocks, the morphemes.

3. The Bloomfieldian representation of words: Morphemics

Within the phonological level the primary units were the indivisible phonemes that occurred one after the other in discrete linear sequences. Accordingly, the study of phonemics consisted of the establishment of these units and the delineation of their permitted sequences of occurrence. This description was important for morphemics, the next largest size level of units, because it was assumed that phonemes "composed" morphemes in an integral way. As a consequence, to spell out the permitted sequences of phonemes within a particular language was to specify the ways in which phonemes composed morphemes and morphemes made up words.

Bloomfield stated this assumption about the composition of morphemes in several places. In the "Postulates" he said that "Every utterance is made up wholly of forms" (155) and that "Every form is made up wholly of phonemes" (157). Thirteen years later he said much the same thing more emphatically in the _Linguistic Aspects of Science_: "once the phonemes are established, any form of the language is completely and rigidly definable (apart from its meaning) as a linear or quasi-linear sequence of phonemes" (1939:24). Thus, between the phonemic level and the morphemic level the primary vertical relation was "made up of", or "composed of," so that, as a result, it was assumed that the morphemes occurred one after another in a linear sequence that was isomorphic with the linear sequence of phonemes.

This syntagmatic conception of morphological structure came to be known, after much discussion back and forth (see Hockett 1968:29), as the Item and Arrangement approach or model (abbreviated IA) and a simon pure example of its application may be seen in Bloch's analysis of English verb inflection (1947; Joos 1957:243ff). In the analysis of a form like *waited*, Bloch rejects a process statement such as "the preterit form *waited* is derived from the base *wait* by the addition of a suffix" in favor of statements "in terms of *morphemes* and their order" (243). Thus, in place of the dubious process "addition of a suffix," Bloch framed his description in terms of the two items, *ed* and *wait*, that occurred in the specific order, *wait* first and *ed* second.

Process statements, called the Item and Process model (abbreviated IP), which had been used by Sapir and his students, were rejected by Bloch and most other Bloomfieldians for the very basic reason that processes like replacement, subtraction, and addition were not, as Hockett puts it, "by any stretch of the imagination composed of phonemic material" (1954; Joos 1957:394) and were looked upon, therefore, as fictions used by the linguist to manipulate his data.[7] Quite obviously a descriptive device that does not consist of the perceptible stuff of language has to be rejected by a model whose goal is "to use terms that would imply no tacit reliance on factors beyond the range of observation." As a consequence, most Bloomfieldian treatments of morphology employed morphemes and linear patterns of arrangement rather than of process statements.

In addition to rejecting the process models of Boas and Sapir most Bloomfieldians also rejected with hardly any discussion at all what Hockett dubbed "the older and more respectable" Word and Paradigm model (abbreviated WP) (1954; Joos 1957:386). Although Hockett gave no reason for by-passing WP beyond "lack of time (386), one can think of any number of reasons why the Bloomfieldians might ignore any discussion of it. First of all, WP was the approach used by the competing traditional grammarians whose notions were rejected by the Bloomfieldians with just as much scorn as the Transformationalists rejected the notions of their closest competition, the Bloomfieldians.[8] Secondly, because utterances were viewed as sequences of morphemes, "words" did not occur in them and were, as a consequence, suspect; the same objection is quite obviously true of paradigms. Finally and perhaps most importantly, the WP model requires one to deal with an extremely compact kind of internal meaning called "grammatical categories." The Bloomfieldians were uncomfortable with this time-honored notion because they lacked, and seemed unwilling to consider, a theory of internal meaning (signification), as we shall see.

Lacking a systematic notion of grammatical categories, the Bloomfieldians tended to treat them in a rather off-hand manner, or to confuse them with units of form. To give a few examples: while discussing English paradigms Hill says that the meanings for suffixes "can be rather quickly given" (1958:143), or that "meanings for the suffixes can in some cases be written without much departure from the traditional" (151), or that "A typical paradigm is that for nouns, where a given form is classified according to the two variations, or categories, of case and number" (138). It is not clear what "variation" means in this sentence, but from the context it seems that "variation" and "variant" refer to morphs, i.e. to units of form. Trager confuses morphs and categories in much the same way when he makes the /m-/ segmented from me, my, mine an allomorph of the grammatical categories 'first, person, singular' (1967:376). As usual, Hockett formulates his own confusion most clearly when he declares in a discussion of the category "case" that "The analytical problem is not any common feature of meaning (in the sense of 'external meaning'), but the very problem of finding the cases themselves--which are either morphemes or morpheme components" or, he adds in a footnote "small classes of functionally related morphemes" (1952:95 and footnote 24).

With the IP and WP models either rejected or used in an ad hoc way, the usual Bloomfieldian approach to morphology was IA; it was not, however, without its own problems. The assumption that every form is made up wholly of phonemes leads to difficulties whenever the number of phonemes does not fit the number of morphemes in an obvious one-to-one manner. When there is a lack of exact fit, as there very often is, the Bloomfieldians' IA assumptions forced them to make counter-intuitive analyses or to create a number of ficticious analytical devices. For example, to analyze to plural form of man, Nelson Francis first reduces the occurring plural men to zero, next he attaches the non-occurring plural suffix -s to man, and then reduces it to zero in the environment of the zero form of men so that, as a result, the zero form of men is made to occur in the environment of the zero form of the non-occurring suffix -s (1958:191).

Archibald Hill attacks the same problem with a verbal manipulation when he says that "the vowel of men will be stated to be a suffix, but one which has the property of occurring in nonsequential order, since it always replaces the stressed vowel (or vowel nucleus) of the base" (1958:140). Many other examples could be given, but Eugene Nida puts his finger on the problem particularly well when he comments on Bloch's IA analysis of sing/sang as follows:

> The past tense form /sæŋ/ is treated as an alternant of /siŋ/. The meaning-difference is considered as expressed by a zero suffix. By this procedure an overt distinction--the replacement of /i/ by /æ/--is treated as meaningless, while the covert distinction becomes the meaning-carrier. I do not deny the significance of zero in such a form, nor the importance of the pattern which leads one to recognize a zero; but it appears to me as strikingly contradictory to treat overt distinctions as meaningless and covert distinctions as meaningful...If we do so, we have given entirely too high a priority to the arrangements of items (i.e. the tactics). (1948; Joos 1957:256)

In addition to this now-you-see-now-don't hocus-pocus, the more inventive Bloomfieldians created a whole battery of descriptive fictions like morphs, allomorphs, zero-morphs, portmanteau representations, empty morphs, canonical forms, etc. to patch up the lack of fit between morphemes and phonemes. But as time went on, it became apparent that these creations did not reflect factors within the range of observation but were, in fact, artifacts of the IA assumption that morphemes were actually composed of phonemes. Again, it was Hockett, one of the most inventive creators of IA fictions, who saw this most clearly and finally cleaned house in 1961 by rejecting this assumption. In its place he proposed that phonemes compose such strictly phonological units as syllables and were related to morphemes by the more abstract relation "mapped into" or "programmed into" (35). Both Trager (1967) and Smith (1967) saw the problem entailed by the "composed of" relation but solved it by setting up yet another unit--the "morphophone."

To sum up this discussion, the Bloomfieldian approach to morphology operated with a set of formal units that were composed of permitted sequences of phonemes and which correlated with meanings in vague and undefined ways. Speaking of the 1940's Hockett says "we came to think of 'grammar' largely as patterns by which meaningful forms (not mere phonemes) combine or arrange into larger forms--an autonomous set of patterns, unrelated to meaning, or at least susceptible to analysis and description as though it had nothing to do with meaning" (1968:25). Thus, because semantic features were ignored--lexical features as well as grammatical categories--only sequencial and constituent relations held between morphemes so that just as with the phonemes, processes, paradigms, and features of substance were rejected as not being part of morphological structure.

4. The Bloomfieldian representation of sentences: Constituents and Constructions

Based on what we now know about morphology, one would expect the transition to be the next largest size-level, syntax, to be direct and orderly. For, if one accepts Bloomfield's three assumptions that utterances are composed of forms, that morphemes are minimum forms, and that words are minimum free forms (1926:155-56), then one would expect sequences of morphemes to group into words and sequences of words to compose a single sentence, the "maximum construction in any utterance" (158). And if one looks at Hockett's constructional grammar, the transition from morphemics to snytax is just as direct as I have just presented it. There are, however, a number of things in actual fact that muddle the picture.

First of all, even though Hockett's constructional grammar is derived from Bloomfield's basic assumptions, it does not look at all like Bloomfield's own syntax. Secondly, neither Hockett's nor Bloomfield's approach to syntax gained very wide acceptance so that a third structuralist approach arose that does not, I believe, conform to the basic assumptions of the Bloomfieldian model even though it might appear to at first glance. The result of these cross-currents was that no single approach to syntax ever dominated Bloomfieldian linguistics in the same way that IA dominated morphemics and the building-block phoneme dominated phonemics. As a consequence, instead of presenting a single transition from IA morphemics to constructional syntax, I shall have to survey the three principal approaches to syntax that vied with one another during the Bloomfieldian hegemony. The three approaches that I will discuss are Bloomfield's "taxeme/tagmeme" model, Hockett's constructional grammar, and Harris' morpheme to utterance model.

Bloomfield's approach to snytax seems to have contained so many difficulties that it was either completely ignored--very few linguists picked up his terms taxemes, episememes, features of selection, modulation--or pieces of it were broken off and swallowed up by other theories. Part of the reason that his approach was dropped is that it was extremely difficult to make out exactly what he was driving at, as Pike clearly indicated in 1943. To give just one example of how difficult it is to understand Bloomfield's syntax, note that even though he repeatedly stresses the importance of immediate constituents (abbreviated ICs) he introduces this crucial notion in the following obscure way: "Any English-speaking person who concerns himself with this matter, is sure to tell us that the immediate constituents of "Poor John ran away" are the two forms poor John and ran away" (1933:161). Because Bloomfield never tells us how the speaker gets this information, the problem of where to make IC cuts never went much beyond this appeal to the native speaker's intuition.

But there was much more to Bloomfield's syntax than ICs. In general, his approach closely paralleled his notion of phonemes, for just as phonemes were viewed as meaningless signals that compose morphemes and keep them apart, so taxemes were viewed as meaningless grammatical signals that compose constructions and keep them apart. Only four different kinds of taxemes were used to define and distinguish all grammatical constructions: (1) features of modulation, supra-segmental phonemes; (2) features of selection, choice of form class; (3) phonetic modification, morphophonemic alternations, and (4) order, word and morpheme positions (1933:163-4).

Bloomfield gives only a few very brief examples of how these four defining features (he calls them "grammatical features" just as he calls phonemes "sound-features") characterize actual sentences so that it is difficult to form a very clear picture of the syntactical description they would produce. Fortunately, however, Eugene Nida applied Bloomfield's features to English in a simon-pure way in his Synopsis of English Syntax (1960; a revision of his 1943 dissertation) so that we can see what kind of description they yield. Put briefly, the picture is a Chinese box of lists within lists within lists (lxiii-lxviii). For example, within the list of "Prediate Expressions" there is a list of 9 classes of "attributives," within each of these there is a list of "taxemes," and within the taxeme of selection list there are long lists of "conditioners" and of various kinds of "constituents" (113ff). In short, Nida's book is a tour de force of taxamonic classification, but beyond that, it leaves one with a handful of fragments rather than an integrated picture of English syntax. It is perhaps for this reason that Bloomfield's taxeme/tagmeme approach was rarely used.

Nor did the second principal way of syntax during the 1950's stimulate very wide interest, even though it was the one most consistent with Bloomfieldian assumptions. In essence the IC and construction approach to syntax, the "constructional grammar" used by Hockett, Bloch, and some others, was the logical extension of IA notions into syntax. Using this technique one begins with a single utterance and works down to the morphemes by cutting between constructions and classifying the segments into construction types. Bloch describes his use of this technique as follows:

> In analyzing a given sentence, we first isolate the immediate constituents of the sentence as a whole, then the constituents of each constituent, and so on to the ultimate constituents--at every step choosing our constituents in such a way that the total number of different constructions will remain as small as possible. We regard the analysis of the sentence (the syntactic analysis) as complete when further analysis would reveal only constructions different in kind from all the constructions established up to that point. An element that emerges from the analysis as an ultimate constituent of a sentence is typically a word. (1946; Joos 1957:157)

The chief consequence of this procedure was that two of the key notions of traditional syntax were eliminated. First, the traditional division between morphology and syntax tended to disappear since constructions subsumed both syntactical and morphological strings equally well;

taken together, they made up what Hockett called the "Tactic Pattern" of a language (1954:215). Secondly, the emphasis on types of constructions eliminated any real need for parts of speech or form classes: all that was required was the list of morphemes that filled a position, i.e. had the same "priveleges of occurrence," within a particular construction type.

In his 1958 textbook Hockett is rather equivocal about the use of form classes: on one hand, he has a chapter on "Form Classes and Constructions" (157ff) and uses the term "form class" throughout the book; on the other, he does not explicitly set up form class labels, but does set up an elaborate list of construction type labels (in Chapters 21 and 22), and does use the notion "construction type very often and quite explicitly. Somewhat later (in 1961), Hockett sees that form classes are inconsistent with a syntax based on constructions. Examining the ambiguity of _yellow_ in "Washing in strong soap will yellow clothes" and "She likes to wear yellow clothes," Hockett observes that "In a constructional grammar, we say that _yellow_ is the same word in both, that clothes is the same word in both, but that the two words are put together by different constructions" so that ambiguity "is then handled wholly in terms either of constructions (_yellow_ _clothes_) or of IC organization (_old_ _men_ _and_ _women_) (229). The alternate method to this, Hockett says, is to use form classes in such a way that "we recognize two words, $\underline{\text{yellow}_1}$ and $\underline{\text{yellow}_2}$, the former belonging to some subclass of the class of verbs, and the latter to some subclass of the class of adjectives" (229-230). Even though Hockett does not explicitly reject the second alternative, it is clear that it is inimical to his Bloomfieldian assumptions because it introduces "inaudible differences among words in such a way that constructions are wholly eliminated as independent ingredients in the grammatical model" (229) Thus, even though one sees the term "form class" in IC and construction descriptions, I think the notion is neither required nor justified by the basic assumption that one relie exclusively on factors within the range of observation.

A more important issue for constructional syntax is that, as the logical extension of IA assumptions, it necessarily incorporates many of IA's theoretical and practical limitations. In particular, if one assumes, as Hockett did in 1952, that "An utterance consists tactically of an arrangement of ultimate tactical units called morphemes, just as it consists of phonologically of an arrangement of ultimate phonological units" (96), then one is obliged to cut up and classify just those elements that occur within that utterance--no more and no less. In other words, one can not with any theoretical justification, add, subtract, or shift around any of the occurring elements with transformations; one has to deal with just those elements that occur and to handle them in just those linear sequences they occur in. Thus, as Rulon Wells points out, "The task of IC-analysis is the task not of describing what utterances occur, but of describing, after these utterances have been given, what their constituents are" (1947; Joos 1957:197). In short, one focuses on one utterance at a time and performs no operations on it beyond segmentation and classification.

Furthermore, the IA assumption that morphemes occur in a discrete linear sequence that is an abstract but direct reproduction of the spoken utterance also requires that all the constituents be immediately contiguous. Whenever they are not, *ad hoc* devices proliferate just as they did when the sequence of phonemes did not match the sequence of morphemes in a simple and obvious way. For, as Wells again observes, if one allows "discontinuous ICs," the possibilities "requiring investigation would be enormously multiplied. A more orderly and manageable procedure is to extend the IC-system as far as possible on the basis of two continuous ICs for each constitute; and then to supplement this system and revise it where revision is called for by admitting the more complex kinds of analysis" (Joos 1957:199). Hockett was also well aware that all ICs are not continuous but was rather uncomfortable about this fact when he observed that "Our examples so far have had another property which is common but not universal: forms which belong together as ICs of a larger form have been next to each other in linear sequence. But discontinuous constituents are not at all uncommon" (1958:154). He does not, however, discuss the implications of this observation and merely recommends two "graphic devices" to use on a sentence like

"Is John going with you?" (154).

In many ways, I think that the Trager-Smith solution to the problem of discontinuous constructions is the most consistent with Bloomfieldian assumptions. In their Outline they call interogatives and negatives different "statuses" of the verbal phrase. What this term implies is that the question "Is he talking" is a completely unique utterance that is not related to "He is talking" (1951:79-80). Each new "status" of the verb phrase produces a completely new grammatical construction that had to be dealt with on its own terms and was not related in an explicit way to any other constructions. In short, transformations and families of transformations were not to be allowed in syntax for the same reason that processes were excluded from morphology: processes are not "by any stretch of the imagination composed of phonemic material" so that to use them in syntax would be to relie on "factors beyond the range of observation."

The direct extension of IA assumptions into syntax was in accord, therefore, with the strong empirical bias of the Bloomfieldians. But it also fulfilled their very pronounced urge for "homogeneity." The property of homogeneity in one's theory was the almost aesthetic requirement that one's conceptual machinery should be as simple and as uniform as possible in order to avoid a hodge-podge of different analytical devices. Bloch, for example, stated his own preference for homogeneity when he declared that

> linguistic analysis in this country has been beset by the curse of eclecticism. Theory

> has come pretty much catch-as-catch-can; techniques have been developed ad hoc in whatever part of the total field there happened to be a need for them. Worst of all, principles more or less accidentally evolved in describing one part of structure have been neglected as irrelevant or have been simply lost sight of in dealing with other parts. It seems to me desirable to evolve an overall theory, one that would treat the four quarters of linguistic structure as parts or aspects of a single system. In trying to do this, we ought to exploit as fully as possible the similarities between phonesis and semiosis, between catalog and taxis; and above all we ought to apply techniques that have proved their value in one field with as little change as possible to the other fields as well. (1953:43)

On these same grounds I am sure that Hockett would have rejected Well's proposal that one go as far as possible with continuous ICs and then revise the system, because he felt that a "'pure' IA approach...is clearly more homogeneous than either a less pure IA, or IP"(1954). I am reasonably sure of Hockett's rejection because at one point (in 1961) he went so far as to recommend that transformations be reformulated as "constructions" because such a reformulation would achieve "a more 'homogeneous' abstract grammar in that there is a smaller variety of seemingly different kinds of things" (231). For, if one wants to work with just those basic linguistic elements that occur as people speak, then one's conceptual machinery should be as simple as possible in order to reflect the immediate reality of that speech. In other words, it was tacitly assumed that the basic design of one's conceptual machinery should reflect the general shape of the objects that it seeks to represent and work with. And since the focus of Bloomfieldian attention was primarily on simple building block units that were abstracted from, and isomorphic with, the stream of speech, the design of the model must of necessity be simple and homogeneous.

In sum, then, because it sought to represent the surface reality of utterances as faithfully as possible, Bloomfieldian constructional analysis cut up and classified the parts of each sentence as it stood. As a consequence, it could not with any theoretical justification add, subtract, or shift about any of its elements, nor could it set up highly abstract underlying forms that were not direct replicas of those elements, nor could it relate the utterance to other utterances that were superficially different but clearly related to it. Furthermore, because its goal was the segmentation and classification of stretches of speech, constructional syntax eliminated form classes in favor of construction types and relied upon immediate constituent analysis even though the latter was notoriously difficult to define in an explicit way (see, Street 1967).

Perhaps the strong limitations on what could and could not be done with ICs and constructions motivated Zellig Harris to propose a third way of doing syntax. Whatever Harris' precise motivation was, his approach became the most productive way of doing syntax doing the Bloomfieldian decades. My reasons for claiming this are two. First of all, Harris' notions are at the heart of the syntax developed by C. C. Fries in _The Structure of English_ (1952), and Fries' approach became the basis for most of the structuralist descriptions of English that appeared in the late 1950's. For, as Shedd very cannily pointed out in his review of Trager-Smith's Outline and Fries' book, the easiest way to cook up a structuralist textbook of English was to bolt a Trager-Smith phonology onto a Fries' syntax (1955: 344), just exactly as Shedd did in his A Short Introduction to English Grammar (1959). Second, in addition to contributing, however indirectly, to these textbooks, Harris' approach also laid the theoretical foundation for Chomsky's version of transformational grammar which forced Bloomfieldian syntax into the shadows. Thus, in a very important way it is Harris, an admirer and associate of Bloomfield (Teeter 1969:2), who lies behind the revolution in syntactical analysis that now dominates the linguistic scene.

As far as Harris' early syntax is concerned, he rejected both ICs and constructions in favor of a rather traditional approach that reasserted the boundary between morphology and syntax by doing the latter in terms of form classes and basic sentence patterns. In his paper "From Morpheme to Utterance" (1946; Joos 1957:142ff). Harris begins with morphemes (he assumes that they have already been identified) and sequences of morphemes, next classifies these into form classes using a series of abstract environments called "diagnostic frames," and finally places the form classes into a small number of sequences that he calls "utterance constructions," or "sentence types," or "utterance formulae" (178). Thus, instead of beginning with a single utterance and working down by cutting up and classifying its constituents, Harris begins with classes of morphemes and works up to classes of sentences. Besides this minor difference in the direction of analysis, Harris' syntax had several other more significant non-Bloomfieldian characteristics. First of all, diagnostic frames are clearly analytical devices that are not contained in any utterance and therefore suspect. Second, the use of form classes not only requires "inaudible differences between words" but also eliminates the need of construction types, the chief "independent ingredients" of constructional syntax. Third, since Harris' analysis uses classes of sentences rather than classes of morphemes, the role of immediate constituents is greatly reduced, if not completely eliminated. In fact, this seems to have been one of the principal modivations for Harris' approach since he felt that "It is not clear that there exists any general method for successively determining the immediate constituents, when we begin with a whole utterance and work down. In any case substitution classes presents fewer theoretical difficulties if we begin with morphemes and work up" (178-79).

The use of form class patterns in place of ICs also appears to have presented fewer practical difficulties since, even though Fries has a chapter on ICs in his book (1952:256ff), he makes no real use of them when setting up his parts of speech and sentence patterns. Moreover, Sledd says straight out that "Since the [IC] analyses which have so far been proposed differ widely among themselves and are often quite arbitrary, it has seemed best to make no direct statement about immediate constituents in this book" (1959:216-17).

I conclude from all of this that ICs are really not necessary if one does syntax with form classes and sentence patterns. But if one eliminates ICs and constructions in their favor, then one is not doing syntax in a way that is consistent with the basic assumptions of Bloomfieldian linguistics. As a consequence, it would appear that Harris' approach was not simply un-Bloomfieldian but was in fact anti-Bloomfieldian, as the events subsequent to 1946 have clearly shown us.

To sum up, if one takes ICs and constructions to be a Bloomfieldian norm, then the extension of IA assumptions to syntax sets up constructions as the basic unit and constituency, "immediately continguous" and "contained in," as the basic relations. Other notions such as function units (subject, predicate, object, etc.), transformations, form classes, and the syntactical categories derivable from the paradigmatic analysis of sentence types are clearly not admissable under the basic assumptions of Bloomfieldian syntax.

5. The Bloomfieldian exclusion of Discourse and Lexicon

At the syntactical level one reaches the topmost limit of structure as the Bloomfieldians' conceived of it. There are, however, potentially two other levels that many other theories include within the pale of structure, discourse and lexicon. Note, for example, how naturally Harris' includes a level of discourse within what is essentially a Bloomfieldian structural scheme when he says that "In all linguistic material, the entities...can be linearly ordered. Each discourse is a sequence of phonemes, more specifically, each morpheme is a sequence of phonemes, each word a sequence of morphemes, each sentence a sequence of words, and each discourse a sequence of sentences" (Harris 1968:9).

Discourse was not considered to be a level of structure because Bloomfield excluded grammatical relationships between sentences when he asserted in the "Postulates" that "A maximum form in any utterance is a sentence" (1926: 138; emphasis mine). This assumption was explained in his book when he said that "An utterance may consist of more than one sentence. This is the case when the utterance contains several linguistic forms which are not by any meaningful, conventional grammatical arrangement (that is, by any construction) united into a larger form, e.g.: How are you? It's a fine day. Are you going to play tennis this afternoon? Whatever practical connection there may be between these three forms, there is no grammatical arrangement uniting them into one larger form: the utterance consists of three sentences" (1938:170). The important phrase here is "practical connection" because in Bloomfield's terminology this means "semantic connection" so that however complex an utterance might be the basic relation between its constituents was semantic rather than "grammatical" and hence outside of Bloomfield's conception of structure.

Bloomfield's position was accepted without reservation by most Bloomfieldians. Witness, for example, Hockett's terse rephrasing of Bloomfield's postulate, "A sentence is a grammatical form which is not in construction with any other grammatical form: a constitute which is not a constituent" (1958:199) and his assertion that this "simple operational definition of 'sentence'...is now generally accepted in practice if not always in theoretical discussion" (208).

The unfortunate result of this acceptance has been to limit the attention of almost all American linguists, from the Bloomfieldians to the Transformationalists, to units no larger than a single sentence and to cut linguistics off from the systematic investigation of discourse: i.e. of such extented oral forms as conversations, monologues, jokes, etc. and of such written forms as paragraphs, essays, poems, novels, etc.[9] As a consequence, American linguists have for the most part made no contribution to nor drawn any insights from the structural study of folklore (see, Dundes 1965), the sociological investigation into the spoken lore and styles of minority groups (see, Abrahams 1970), the anthropological investigation of oral literatures (see, Edmonson 1971), much less the analysis of written literatures (see, Wellek 1963:310). In fact Kenneth Pike has seen Bloomfield's definition as the principal factor that "has prevented, in this country, the development of linguistics so that it would be integrated more closely with studies of literary form" (1967:146).

Of course, the more perceptive Bloomfieldians were well aware of this schism between linguistics and literary analysis. For example, Hockett once noted that "The relatively precise machinery of analysis which linguists have developed does not yet enable us to make effective statements about stylistic or structural features of longer segments of discourse--conversations, narratives, "paragraphs," or whole stories... The terminological arsenal of the literary scholar applies, often very well, to the largest size-levels of this structure; that of the linguist applies equally well to the smallest size-levels; but there is at present a poorly explored terrain in between" (1958:557). What Hockett did not say, and perhaps did not see, was that any exploration of the no-man's land between linguistics and literary analysis was extremely unlikely as long as Bloomfield's assumption about the lack of formal relations between sentences was adhered to. This schism has been a loss to both disciplines because, on one hand, literary analysis could benefit from the rigor and systemic approach of linguistics whereas, on the other, linguistics might well derive a good deal of help from literary studies in the analysis of meaning, since it is clear that the semantic analysis of sentences can best be done by reference to their linguistic contexts, i.e. to the discourses that they occur within.

Bloomfield's lack of interest in the lexical level had similar unfortunate consequences for the linguistic analysis of lexical structure in this country. Because Bloomfield looked upon the lexicon as a list of the "total stock of morphemes in a language" (1933:162) at best, or as "an appendix of the grammar" (274) at worst, the Bloomfieldians virtually ignored both lexical theory and practical lexicography. As a result, Bloomfieldian linguistics again isolated itself by ignoring the important work done by anthropologists in domains, lexical fields, and semantic components (see, Tyler 1969 and Hammel 1965) as well as the invaluable fund of experience accumulated over hundreds of years by the makers of dictionaries. The reason for this lack of interest in discourse and lexical structure lies in the Bloomfieldian squemishness about meaning, for, if one is to study these areas in any way at all, one must seriously consider the problem of meaning, as the Bloomfieldians did not. Let us now look at some of the reasons why the semantic dimension of language was virtually ignored in theory and only paid lip-service to in practice.

6. Meaning: Bloomfield's theory and the Bloomfieldians' slant

In addition to an almost exclusive emphasis on formal units with syntagmatic relations, a second fundamental characteristic of Bloomfieldian linguistics is its unique treatment of meaning in theory and practice. If one believes the critics, the primary feature of this treatment is neglect: Einar Haugen states flatly that American unlike European linguists "shun" meaning (1951; Joos 1957:359); in The Study of Language, John B. Carroll notes that in their methods of analysis Americans try to analyze structure without reference to meaning (1953:15); and J. R. Firth has pointed out the attempt of American linguists "to exclude the study of what they call 'meaning' from scientific linguistics" (1957:225); and, finally, Floyd Lounsbury called "An avoidance (one could even say abhorrence) of meaning as a criterion in linguistic analysis" one "distinguishing features" of the American linguistic outlook during the forties and fifties (1962: 281).

Far from being disturbed by these criticisms, American linguists seem to feel that it is precisely this neglect of meaning that has made their methods uniquely scientific and rigorous. A convenient example is the conception of linguistics outlines by Martin Joos in a paper called "Description of Language Design" (1950; Joos 1957:349-356). Joos feels that the restriction of linguistics to the "quantifiable" makes it so rigorous that it is a kind of "discontinuous or discrete mathematics" (349). Using this mathematics, linguists are able to describe the grammar of a language "without reference to what is popularly thought of as 'meaning,' namely the popular categorizations of continuous reality such as 'nose' or 'numerous'" (350). Continuous reality and meaning are for Joos "the semantic field, outside linguistics, where sociologists can work" (349). The implication is rather strong that linguists, who claim a small territory but map it carefully, are much more scientific than laymen and sociologists who wander at large in uncharted semantic fields.

As extreme as Joos' statements may seem, they are not artfully selected examples of isolated rhetoric but characterize rather accurately a basic assumption of Bloomfieldian theory: the semantic substance is not a part of language structure but outside of it, just as the sound substance is outside of phonemics. Hockett spells out this assumption quite explicitly in the keystone chapter of his book "The Design of a Language" (cf. Joos' title "Description of Language Design") (1957: 137). In this chapter Hockett characterizes language structure in terms of three central and two peripheral systems: the three central systems are grammar, phonology, and morphophonemics; the two peripheral systems are semantics and phonetics (137). The important issue as to where semantics belongs in these systems is at first merely "a matter of personal taste and not important" (138). Later on, however, Hockett becomes more emphatic and asserts that "an utterance has neither a 'semantic structure' nor a 'phonetic structure'" because, for Hockett, semantics and phonetics are "habits," not structures (142). Neither Joos nor Hockett consider meaning to be part of the structure of language and consequently do not discuss it in a systematic way, nor, in fact, did any other Bloomfieldian. In other words, meaning had no status as a real entity within language nor as a category within the Bloomfieldian theory of language description; it was outside of both the stuff of language and the conceptual machinery set up to characterize that stuff.

And yet, meaning could not be shaken off completely, there was always just a little bit that remained; it did not, however, have any legitimate theoretical status. In the practical situation of analyzing an unknown language or their own idiolects, the Bloomfieldians, like all other linguists, used meaning. But notice how they did it: Bloch calls his use of semantic criteria a "practical device" that should be used to avoid wasting time (1948:5); Trager and Smith carefully eschew any discussion of meaning but find it handy "as a general guide and shortcut to the identification of morphemes" (1951:54); Harris says much the same thing (1951:186-87) whereas Hockett carefully distinguishes between "the heuristic use" of meaning and the detailed study of the three central subsystems of language (1958:138-39). Thus, even though meaning was not part of the landscape of language nor on the Bloomfieldian map, it did, nevertheless, make a handy guidebook.

This rather equivocal stance of excluding meaning from structure and theory while using it in practice was, I think, shared by enough Bloomfieldians to be called "typical" and, like most of the typical features of Bloomfieldian linguistics, it can be traced back to Leonard Bloomfield. Hockett did this explicitly, if somewhat indirectly in a footnote, when he called his own approach to meaning "the Bloomfieldian slant" and contrasted it with "the European tendency to think of meaning as 'in' the linguistic system" (1955:222, note to section 0215).

Since this slant is certainly the basis for the Bloomfieldians' position on meaning, we should examine it in some detail.

At several places in Language (23 and 139) Bloomfield schematizes the speech situation into three parts from which he derives all of the basic elements of his theory. These parts are:

A *B* *C*
speaker's situation ⟶ speech ⟶ hearer's response

B is an act of speech, or utterance, from which all linguistic forms are derived. *A*, the speaker's situation, and *C*, the hearer's response, are not feelings nor ideas but "*real* or *practical* events, stimuli and reactions" (27; Bloomfield's emphasis), and it is here that meaning lies for "the meaning of a linguistic form... is...the situation in which the speaker utters it and the response it calls forth in the hearer" (139). *A* and *C* are "real" in the sense that Bloomfield reduces them to perceptable physiological events in the following way: when his ideal speaker, Jill, is hungry, this "means" that "some of her muscles were contracting, and some fluids were being secreted, especially in her stomach" (23).[10] The obvious conclusion to draw from these unsavory operations is that the "meaning" of *hungry* could be explicitly defined "only if all branches of science, including, especially, psychology and physiology, were close to perfection" (78). But since this was not the case, linguistics could only analyze the forms in *B* (speech) scientifically; it had to deal with the stimuli and responses of A and C with "makeshift devices" (140). As a result, the analysis of meaning was considered to be "the weak point in language-study" (140).

We can now see the basis for Joos' and Hockett's attitude toward meaning. Meaning is not "in" B, the utterance, but is part of the real world around it, A and C; hence, Hockett's remark about the Bloomfieldian slant. Since linguists concentrate on the forms in B, the real events of A and C are the proper domain of the other sciences--physiology, psychology, and, for Joos, sociology. In other words, meaning was limited to just external or referential meaning and internal meaning was not even considered. It should be carefully noted, however, that even though Bloomfield excludes meaning from speech, he does not exclude it from his theory of linguistics. In fact, meaning and form are equal partners in Bloomfield's basic assumption about language, i.e. that "in every speech-community some utterances are alike in form and meaning" (78). The important consequence of this assumption is that Bloomfield's entire theory is completely bifurcated by form and meaning since for each meaningless unit of signaling he sets up a corresponding unit of "constant and specific meaning." That is, units of meaning, called "sememes" and "episememes," pair off one-for-one with units of signaling, called "phonemes" and "taxemes," to make "forms," called "morphemes" and "tagmemes." As a result, a "form" for Bloomfield is the correlation of units of meaning with units of signaling so that, in more general terms, signal units (phememes) plus meaning units (noemes) yield linguistic forms (glossemes). This correlation may be represented in a chart that simply rearranges the terms that Bloomfield used in the first part of Chapter 16 "Form-Classes and Lexicon" (264).

	Signal units (phememes)	+	*Meaning units* (noemes)	=	*Linguistic forms* (glossemes)
Lexical	phonemes	+	sememes	=	morphemes
Grammatical	taxemes	+	episememes	=	tagmemes

The important conclusion to draw from these correlations is that for Bloomfield a *linguistic form*, whether it be a morpheme or a tagmeme, is not a meaningless shape, as we now take it to be, but a correlation of units of form with units of meaning. I stress this point because Bloomfield's position is by no means easy to understand at first glance. For example, speaking of what Bloomfield meant by *form*, Hockett said as late as 1968 that this is "one of the most obscure aspects of Bloomfield's views, perhaps best represented by the first part of the chapter 'Form-Classes and Lexicon'" (20), and that "To many of us in the 1940's it did not make sense; it still does not to me, though I can now explain my dissatisfaction with it much more clearly that I could have twenty years ago" (21). Hockett finds Bloomfield's view obscure, I suppose, because he does not accept "meaning" to be a part of "form," as Bloomfield quite clearly did.

An important consequence of including meaning within his theory is that Bloomfield, unlike his followers, discussed the problem of meaning all during his career as a linguist. Excluding reviews, his discussion began in 1926 in his "Postulates," was elaborated in Language, continued with his contribution to the International Encyclopedia of Unified Science (1939), and finally ended in an article written in 1943 entitled "Meaning." In sharp contrast to this, only one of Bloomfield's followers, Joos, has devoted a paper to the problem of meaning (1958); and, whereas Bloomfield's Language has one whole chapter devoted to meaning whereas Hockett's book has none. The point that I am trying to make is that although meaning was not a part of language structure, it was a part of Bloomfield's linguistic theory so that it was included in all of his discussions of linguistics. As a consequence, it would seem that it was the Bloomfieldians, not Bloomfield who slanted American linguistics away from the systematic discussion of meaning.

And yet, it is possible to find the seeds of the Bloomfieldians' exclusion of meaning in Bloomfield's own formulation of the problem. To define the meaning of an utterance Bloomfield required either an omniscient observer of the speech situation or a complete scientific description of everything in our world, inside the speaker and out (1933:74ff).[11] Since neither of these was immediately attainable, the Bloomfieldians became understandably leary about tackling the problem of meaning much less cracking it. But, being a practical man, Bloomfield did mention a more immediately attainable goal that seems to have been taken up and made the basis of the Bloomfieldians' slant. This was the analysis of utterances in terms of their sound features, without any reference to their meaning; as Bloomfield put it: "The study of language can be conducted without special assumptions only so long as we pay no attention to the meaning of what is spoken" (1933:75). I believe that it is this statement, and others like it, rather than Bloomfield's form-meaning correlation that became the fundamental assumption of Bloomfieldian theory and practice. In order to avoid the makeshift devices and clumsy special assumptions that the inclusion of meaning required, Bloomfield's followers played down meaning and made the sound features of an utterance the foundation of their theory and practice. The shift away from Bloomfield's form-meaning correlation to a theory based on the distributional analysis of phonemes can be seen most clearly in Bloch's reformulation of Bloomfield's postulates.

Although explicitly modeled on Bloomfield's work (note, for instance, the similarity between Bloch's title "A Set of Postulates for Phonemic Analysis" and Bloomfield's "A Set of Postulates for the Science of Language") Bloch's postulates differ significantly in their attempt to completely eliminate semantic criteria from the foundations of phonemic theory. Bloch states his purpose as follows: "In our wording we shall avoid all semantic and psychological criteria. The implication is, of course, that such criteria play no part, or at least need not play one, in the theoretical foundation of phonemics... The basic assumptions that underlie phonemics, we believe, can be stated without any mention of mind or meaning..." (1948:5).

Bloch's statement is crucial not only because it epitomizes the Bloomfieldian slant on meaning, but also because it is an important step in its development. For what Bloch did in his postulates was to eliminate meaning by means of a highly formalized analysis of the sound features and their distribution. His success in doing so not only put phonemics on a "scientific" foundation, i.e., based on directly observable forms rather than on the mentalistic constructs of the analyst, it also must have encouraged the attempt to reformulate both morphology and syntax in terms of phonological rather than semantic criteria. Concerning the latter Hockett notes that "During the 1940's some of us suspected that it might be possible to determine the forms of a language, and all the patterns by which they combine into larger forms, without any reference to meaning at all. Some decided that this was not only possible, but, indeed, the only rigorous procedure, even if occasional resort to meaning might be a useful practical shortcut" (1968:24).

I do not know the exact steps by which Bloch's distributional assumptions were extended to all the levels of language, but there can be no doubt as to its fullest flowering. It is in the 1951 codification of Bloomfieldian theory and practice that became the structuralist paradigm of rigorous linguistic description--George L. Trager's and Henry Lee Smith's Outline of English Structure. In this short booklet of just 88 pages the structure of English, as they conceived it, was carefully built up, level by level, on an elaborate phonological foundation (44 pages are devoted to phonology, 14 pages to morphology, and 13 pages to syntax. At each stage of the analysis, the reader is assured that it is all being done without any "resort to meaning," except as a short-cut (54). At the morphological level, for example, we are told that "morphemic analysis should be based on the fullest possible phonological statement in order to be complete" (53) and that meaning is not necessary. Syntax is done in a similar way, but I will let Trager and Smith describe it in their own words because I suspect that one of the most influential features of this book was the authors' chipper tone of absolute confidence. They declare that

> The procedures for syntactic analysis do not differ essentially from those already used. With the phonology completely established, and the morphological analysis completed, the syntax of a language like English can be constructed objectively, without the intervention of translation meaning or any resort to metalinguistic phenomena.
>
> Utterances are analyzed syntactically about as follows: A phonemic transcription is made first; this determines the portions of utterance that can be separated out and treated as units, namely the phonemic clauses. The units thus determined are the first IMMEDIATE CONSTITUENTS... It is emphasized that all this is done without the use of 'meaning': it is formal analysis of formal units. In fact, it becomes evident that

> any real approach to meaning must be based upon the existence of such an objective syntax, rather than the other way round. (68)

Here Bloomfield's form-meaning correlation has not only been completely broken up but actually turned up-side-down; that is, because the phrase "objective syntax" quite obviously means 'phonologically based' syntax, meaning has been made dependent upon the sound signals instead of being correlated with them. The shift from Bloomfield's form-meaning correlation to the Bloomfieldians' slant is here completely realized.

The natural consequence of the Bloomfieldians' rejection of Bloomfield's form-meaning correlation was that meaning was dropped as a category from their theory and shunted off the linguistic map into such second-rate limbos as "metalinguistic data," "semantic habits," "heuristic devices," etc. As a result, Bloomfield's forms were reduced to hollow elements with only shapes and sizes but completely devoid of semantic substance.

A new schema resulted from the Bloomfieldian's slant and was codified by Trager in a brief but very influential paper called The Field of Linguistics (1952).[12] In this paper Trager reorganized the form and substance of language into three divisions: first, sound substance was excluded from structure and assigned a peripheral position as "prelinguistic data"; next, Bloomfield's units of meaning were excluded from structure and reduced to "metalinguistic data"; and, finally, situated between these two peripheries was the central area of structure, called "micro-linguistics," or simply "linguistics," which encompassed the meaningless forms (morphemes) and meaningless sound signals (phonemes). The net result of Trager's reorganization was a completely new "Bloomfieldian model" which differed in several fundamental ways from Bloomfield's. The basic characteristics of Trager's schema, as well as Hockett's variant of it, are compared with Bloomfield's original framework in the diagram below (underlined terms are part of structure; those in parenthesis are not).

	Bloomfield	Trager	Hockett
1. meanings :	noemes	(metaling.data)	(semantic habits)
2. sentences:	tagmemes	microlinguistics	grammatical system
3. words :	morphemes	"	"
4. sounds :	phonemes	"	phonological system
	(phonetics)	(preling.data)	(phonetic habits)

7. Summary and Conclusion

With the preceding exposition in mind, the Bloomfieldian notions of structure and meaning may now be summed up. Put briefly, "structure" consists of formal units that have two primary relations. The units are "formal" in the sense that they have "shapes" and "sizes" but embody neither sound nor semantic substance: they are pure forms that signal differences but lack intrinsic matter. As a consequence, paradigmatic relations between such units are not admissible because paradigms are conceptual devices for correlating features of substance with formal units; for correlating, that is, distinctive features with phonemic units, grammatical categories with morphemes, syntactical features with constructions, lexical features with words, and semantic components with discourse units. Instead of such paradigmatic correlations, the Bloomfieldians emphasized two other relations: the first was syntagmatic in that units within the same size level were related to each other in linear sequences; hence, the importance of "tactic patterns" within a level. The second held between units of different size levels and was "composed of" or "made up of" so that phonemes composed morphemes, morphemes made up words, and words composed sentences. In sum, the notion "structure" was restricted to those formal units between the phonemes and a single sentence that occurred in tactic patterns on the same size-level and that composed larger units on higher levels. Anything else was "data," "unstructured habits," "mentalistic constructs," and, therefore, not structure.

At this point one might wonder why the Bloomfieldians focussed so exclusively on form and syntagmatic relations to the exclusion of substance and paradigmatic relations. The question arises naturally because almost every other school of linguistics recognizes more than one kind of relation in language. There are, I believe, at least two basic reasons for the Bloomfieldian position. The first is methodological. If one recognizes only one kind of structure, then the conceptual machinery required to describe it is much simpler, i.e. homogeneous, than the machinery needed to describe a more complex system. Not only is the machinery simpler but the steps needed to process a single kind of structure are fewer. In fact, the operations needed to analyze forms syntagmatically are just two; for example, Harris describes the machinery used in Methods in Structural Linguistics as follows:

> The whole schedule of precedures outlined in the following chapters, which is designed to begin with the raw data of speech and end with a statement of grammatical structure, is essentially a twice-made application of two major steps: the setting up of elements, and the statement of the distribution of these elements relative to each other.
>
> First, the distinct phonologic elements are determined (Chapters 3-4) and the relations among them investigated (5-11). Then the distinct morphologic elements are determined (12) and the relations among them investigated (13-19). (1951:6)

The repeated application of this simple two-step operation is not only neat and consistent, but also exemplifies what the Bloomfieldians' mean by the term "rigor" or "rigorous technique" --a property of analysis that was so important to them that it was never really defined explicitly. But if we read between the lines, it becomes apparent that "rigor" meant to "think operationally" in such a way that a small number of very simple operations could apply with equal efficiency to all levels of language. For example, using the term "field" for what I have referred to as levels, Bloch declared that "above all we ought to apply techniques that have proved their value in one field with as little change as possible to the other fields as well" (1953:43). As we know, Bloch's program was successfully carried out since the analytical techniques that produced the phones, allophones, and phonemes of phonemics were extended to the next higher level to produce the morphs, allomorphs, and morphemes of morphemics. Bloch even went a step further and proposed the units "tome" and "tomeme" for syntax (43-44).

In addition to operational rigor, a consequence of applying a few operations to all the levels of language is that an extremely compact, homogeneous and therefore unified picture of linguistic structure is produced. It produces what Bloch called a "unified theory of structural description" and characterized in the following very operational way:

> My theory of a unified approach to linguistic structure and linguistic analysis, based on a consistent set of assumptions, exploiting a reasonably uniform set of techniques, and provided with a consistent technical terminology, is here only adumbrated. It remains for all of us--for you no less than me--to see whether it can be given substance. (44)

Given this urge to establish a unified theory on an explicitly defined operational base, one might suppose that Zellig Harris' work would be hailed as the most perfect realization of the Bloomfieldians' theoretical and practical goals. Quite the reverse is true: Harris' large body of consistently brilliant work on the foundations of Bloomfieldian methodology was received with wary diffidence or condemned out-right as "hocus-pocus" (Householder 1952:260) and "theoretical nihilism" (Hockett 1968:35). The reason for this is that Harris violated, or at least appeared to violate, the second basic tenet of Bloomfieldian linguistics: the empirical requirement that linguistic elements be "real" in the sense that they "occur as people speak" (Hockett 1961:50). Hockett condemned Harris many times on this score (see, 1968:34-36) but most clearly in 1952 when he wrote that

> Harris is wrong in defining the 'system' as what the analyst does with the data he gathers through observation of behavior. We do not allow the analyst simply to play mathematical games with his data. We require him to produce a systematization which in an operational sense matches the habits which we ascribe to the speaker. (98)

Furthermore, Hockett demanded that this matching of description with data must be done in such a way that no "artifacts of analysis or conveniences for description" (1961:42) be set up; one simply built up a hierarchy of classes of classes of different sizes upon the perceptible sound signal itself, anything else was a hocus-pocus manipulation of the data, and therefore to be rejected.

In sum then, the Bloomfieldian search for an operationally defined and homogeneous theory was balanced by the requirement that the description rely on factors within the range of observation; taken together these two requirements characterize the foundations of the Bloomfieldian model and the particular representation of sounds, words, sentences, and meanings that it presents to us.

Footnotes

[1] Exceptions to this, which I have found very useful, are Hall 1951, Fries 1962, Lounsbury 1962, Teeter 1969, and, above all, the papers by Hockett referred to in the text.

[2] Bloomfield's most important works for my purpose are his "Postulates" (1926), Language (1933), and Linguistic Aspects of Science (1939). The greater part of Bloomfield's work plus invaluable supplementary material has been collected together by Hockett (1970).

[3] Hockett also appears most frequently because he above all the others has relentlessly pursued the critical examination of Bloomfield's, the Bloomfieldians', and his own linguistic conceptions.

[4] For example, in his long monograph "On defining the phoneme" Freeman Twaddell notes that the "complexities connected with the use of the terms 'feature' and 'features' represent for me the greatest difficulty in determining precisely the meaning of Bloomfield's definitions of the phoneme"(1935; Joos 1957:62, note 4). And, in point of fact, Twaddell appears to have missed Bloomfield's meaning since he says "whether a 'phoneme-feature' is a feature *of* a phoneme, or a feature *which is* a phoneme, we are not told: presumably the former," (62; emphasis mine), which is clearly wrong. It has to be the latter: "a feature *which is* a phoneme."

[5] On the rather condescending attitude of some Bloomfieldians toward Sapir see Hall 1951:107-08 and Joos 1957:25.

[6] On the effort of the Bloomfieldians' to base their phonology on utterances rather than words, see Hockett 1968:26.

[7] The sentence just quoted is, I think, the source of most people's feeling that Hockett's "Two Models" paper (1954) favors the IA approach over IP even though he strongly denies it in Hockett 1968:29 and note 18.

[8] Just as early Transformational papers invariably began with "The inadequacies of phrase structure grammar" so most Bloomfieldian textbooks began with a chapter on "Misconceptions about Language," misconceptions that had been foisted upon us by Traditional grammar and its laughable personification Miss Fidditch.

[9] The only important exception is Harris' work on discourse analysis (1963).

[10] Note in this connection the following revealing anecdote recorded by Hockett: "Hockett touches on 'mental illness.' Bloomfield: 'No; there has to be something wrong chemically in the brain'" (Hockett 1970: 542).

[11] From this statement and others like it, it seems clear that what Bloomfield anticipated was that the other sciences would eventually segment and classify all the external objects and internal mental states (reduced, of course, to measureable physiological and chemical factors) of our world into the same kind of discrete, sequentially ordered units that linguistic science had achieved for language. With this done, these units of meaning could then be correlated in a sinple and direct way with the units of linguistic signaling.

[12] Trager's paper is noteworthy because it has all the earmarks of something unique in American academic life--the manifesto of a self-conscious "school." On page 8, note 1, for example, Trager says "This programmatic statement results from discussions begun by members of the staff of the Foreign Service Institute...in the summer of 1947, continued by correspondence during 1947-8, and resumed in the summer of 1948." He then lists such well-known linguists as H. L. Smith, Henry Hoenigswald, John Echols, Charles Ferguson, C. T. Hodge, Hockett, and John Kepke, and concludes by saying that he "is chiefly responsible for the actual wording, _but all those mentioned are in substantial agreement on the content_" (emphasis mine).

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The Feature of Length in Semitic

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This paper presents some tentative thoughts on a working hypothesis that Semitic possessed a morpheme of *length*[1] (vocalic or consonantal) the semantic content of which varied according to its position in the word. I use here the colon to represent a *sounded* long phone; a macron to represent an *orthographic* long vowel and a double consonant to represent orthographic gemination (*tašdīd* or *dāgēš forte*.) Thus we may have for example:

N $= C_1V_1C_2V_2C_3V_3$

the N $=*C_1{:}V_1C_2V_2C_3V_3$

Vb$=C_4V_4C_5V_5C_6V_6$

is Vbed$=*C_4{:}\ V_4C_5V_5C_6V_6$

tried to Vb $=C_4V_4{:}C_5V_5C_6V_6$

Vbed greatly $=C_4V_4C_5{:}V_5C_6V_6$

This phenomenon is made possible in this form by the relatively rigid shape of Semitic words with their "triliteral stems" but has been obscured by sound change, e.g. C: > nC or lC in currently known Semitic languages.

I hope to pull together under the feature of length items as disparate in their current manifestations as the indication of plural in nouns; the definite article;

the conjugations of the verb, and certain anomalous verb forms. I wish eventually to expand these ideas beyond Hebrew and Arabic to which they are restricted here.

1. Verbs

The reconstructed basic verb forms are taken to be: *qatala (perf.) and yaqatala (impf.)[2] with vowels *i* or *u* also possible for V_2 with semantic difference.

We posit that Semitic formed aspects of its verbs by *lengthening any of the first five phonemes* of the verb. Two of these are very obvious. Others are obscured by sound change.

Length of C_2 gives the Hebrew *piʿēl* and Arabic II:

Ar. qatala → qat:ala
He. qatila → *qat:ila > *qit:il(a)[3] > qittēl

Length of V_1 gives the (rare) Hebrew *pōʿēl* and Arabic III:

Ar. qatala → qa:tala
He. qatila → *qa:tila > *qo:til(a)[5] > qōtēl

Less obvious is the fact that the length of C_1 gives Hebrew *nipʿal* and Arabic VII:

Ar. qatala → *q:atala > *nqatala > (i)nqatala
He. qatala → *q:atala > *nqatal(a) > *inqatal >
*niqatal[6] > niqtal[7]

The basic sound change is C: > nC.[8] In Arabic there is a prosthetic vowel which is said to be elided if a vowel precedes; it would be more correct historically then to say that a vowel is inserted if no vowel precedes. Long consonants are phonologically possible at the beginning of words; Moroccan Arabic has them, in some cases perhaps they represent an ancient Semitic form.

In the Hebrew impf. *yiqqātēl* the original consonantal length was retained, i.e. it is incorrect to say that "the *n* was assimilated," and in the imperative it shows up with a prosthetic *i*. Although this latter form is written with the graph for *h*, it is highly probable that this merely represents a vowel at the beginning as it often does at the end, i.e. *hqtl* should be normalized *iqqātēl*. So Arabic inital *'alif* without *hamza* = Hebrew initial *h*.[9]

Length of V_2 gives Hebrew *hipʿīl* and Arabic IV.

Ar. (impf.) *yaqatilu→*yəqatí:lu (vowel centralized with shift of stress[10]) > *yəqti:lu. The long vowel is again shortened by analogy with the other conjugations, and the semantic load is shifted to the first syllable. (Pf.) *qata:la > *qta:la > *aqta:la. The vowellessness[11] of C_1 was caused by the length of V_2 which has become short again by analogy with other conjugations and the semantic load is shifted to the first syllable. The presence of *hamza* is unexpected.[12]

He. *qatila (alternate form of simple verb)→ *qati:la> *qti:l(a) > iqtīl. (Impf.) *yaqatilu > yaqtīl (vowel loss with change of stress.)

Length of C_3 gives the rare Arabic IX and also may explain certain Hebrew "adjectives" *'aruk:a 'it was long' in a participial form to *'ārōk* with change C:# > C# - but with length preserved in fem. and plur. where there was no apocope. Hebrew adjectives denoting colors are frequently of this form, and it may be noted that Arabic IX is largely restricted to this class.[13]

Sometimes more than one phoneme of the simple form was lengthened. This gives Arabic XI (length of V_2 and C_3) and explains some anomalous Hebrew forms - *nikkappēr* 'will be atoned' (Deut. 21.8), *hinnabbʼū* 'purported to be prophets' (Jer. 23.13) which have length of C_1 and C_2. The form ngōʼlū 'are polluted' (Is. 59.3), however, is best explained as an internal passive with length of $C_1 <$ *g:u'ila + plur. morpheme.

2. Nouns

Definiteness was expressed in Semitic by a long first consonant, as suggested by Ullendorf:[14]

*bayitúna	'a house'
*b:áyituna	'the house'

The change of stress occasions the elision of the last syllable, explaining the lack of nunation in definite nouns in Arabic.[15] In Hebrew the sound change was #C: aC: and later #aC_1: and #a:C_2 and #eC_3 where C_1 =most consonantal phonemes, C_2 = some consonantal phonemes e.g. *r*, and C_3 = some consonantal phonemes coupled with specified conditions of stress. Initial orthographic *h* again represents an initial vowel.

In Arabic the sound change was #C: > #(a)lC_1 and #(a)C_2:. The classical Arabic orthography bears on its face the fictions that (1) the *l* is assimilated before "sun-letters" (C_2) when in reality it was never there; and (2) the *a* of *al* is elided after vowels, whereas in reality the *a* or *i* is inserted prosthetically after consonants or at the beginning of a discourse.

This change must be seen as parallel to the change in the *nip'al* above. *l* and *n* must represent originally the same phoneme which dissimilated the long first consonant, and a dialect borrowing situation must be involved, the precise character of which we can only guess.[16]

Sound plurals and the dual are formed by vowel length in the noun suffix. In Arabic

Masc. *xa:dimuna[17] xa:dimu:na 'male servants'
Fem. *xa:dimatuna xa:dima:tun 'female servants'

In Hebrew

Masc. sing.*malakima>*malki > *malk >*málek > mélek 'king'
Fem. sing. *malakatima>*malkati > malkā 'queen'

give rise to

Masc. plur. *malaki:ma > mlākīm
Fem. plur. *malaka:tima>*malaka:t > mlākōt

The dual represents a specialized use of the singular accusative with length (*a:ni* with dissimilation of the last vowel.) The oblique form in *ayni* is perhaps a dialect variant (cf. Hebrew *dōtān*/*dōtayn* Gen. 37.17.) Hebrew fossilized forms like *yōmām* 'by day', *šilšōm* 'day before yesterday' represent another specialized use of the accusative ending plus length.

Many broken plural patterns ('af'āl, fu'ūl, fi'āl) display a long vowel before the final consonant of the root. This suggests that while sound plurals lengthened the vowel of the noun ending (*uma*, *atuma* etc.) broken plurals lengthened the vowel of the body of the noun. This is seen in a straightforward way rarely e.g.

baladun (*baladuna) 'city' plur. *bilādun* (< *bala:duna.) The alternative plural *buldānun* is to be derived from a form with a lengthened accusative morpheme (*baladānu) with a change in the first vowels similar to that proposed for form IV of the verb above. Nunation is added analogically. A plural such as *kilābun* 'dogs' suggests as sing. *kilabuna or *kalabuna. This pattern exists as in *'inabun* 'grape' and may have been a doublet of the standard sing. *kalbun*.

3. The Verb *to give*

It is been indicated here that the presence of *n/l* is a hint of concealed original length. The Hebrew verb *nātan* contains *n* at both ends. It may have been originally simply *ta*; the length feature gives various forms. Impf. *yat:ina (the final *n* of the classical form *yittēn* being derived from the verbal *suffix*) **perf.** 2d. pers. with length *t:ata giving *tatā* (2Sam. 22.41) preserved only in dialect, and the standard *nātattā* via t: > nt with *a* inserted by analogy to regular perfect verb forms. The *nipʿal* forms are differentiated from the simple forms on the basis of analogy with triliteral verbs. Here again the "assimilation of the *n*" is not involved; it is rather the change in the long consonant.

Probably many verbs in Hebrew beginning with *n* were originally biliteral. It is notable that one verb in *l*- behaves similarly, i.e. *lāqaḥ*. This probably was borrowed from a dialect containing a variety of *n* sounding to other speakers like *l*.[18]

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1 There is some evidence for such a morpheme in Dravidian also. See P.C. Ganeshsundaram, "Morphemic Values of Consonants in Tamil," *Indian Linguistics* 16 (1955) "Perhaps the form *koṭṭu* from *koṭu* 'give' means 'give with a vengeance'." This curiously resembles the Semitic intensive form which is marked by length of the middle consonant of the root. Also the geminate past tense marker in Tamil tends to render the verb transitive (*-tt-*) This undoubtedly originally marked a t:/t distinction rather than the modern colloquial t/d distinction.

2 I do not discuss here the distinction between *yaqatulu* and *yaqtulu*. Semitic may originally have been monotemporal with sound change leading to specialized forms, as well as the placing of the affix after, rather than before, the verb.

3 By assimilation. For a similar drift in Arabic see C.A. Ferguson, "The Arabic Koine" Lg. 35 (1959), 619; on the character of this change see H.M. Hoenigswald, "Graduality, Sporadicity and the Minor Sound Change Processes," *Phonetica* 11 (1964), 202-215.

4 i> ē is a regular late Hebrew development (*'ēz*<*'izzu, *ābēl*<*'a:bilu etc.)

5 a: > o: See Z.S. Harris, *Development of the Canaanite Dialects*, (New Haven, 1939), 43-45.

6 By **metathesis**.

7 V$_2$ is elided when C$_3$ is voweled and its syllable is accented. Cf. 'āmar but āmrā, ydabbēr but ydabbrū.

8 At the beginning of a word: in the Hebrew imperfect the original length is retained. In Arabic *n* is brought in by analogy. The Hebrew imperative is a secondary formation from the imperfect. Forms such as Hebrew bēhārēg (Ez. 26.15) lērā'ōt (Ex. 34.24) point to the prosthetic nature of the vowel where there is no *n*. See the numerous cases cited in H. Bauer, *Historische Grammatik der Hebraeischen Sprache* (Hildersheim, 1962), 228.

9 It seems likely that the *h* is used to represent "nothing", i.e. is a vowel bearer, elsewhere. Later Hebrew has *mō(h)ēl* as the participle of the root *mūl* which is quite on the lines of the Arabic participle of the type *qā'im*. It is probably an attempt to represent a dialect which had originally a glottal stop which became an *ōē* glide. From this the other parts of a new verb *māhal* appeared by back formation. Probably Aramaic forms like *bhēt* have a similar explanation.

10 It seems to me that the vowel sign *ḍamma* of classical Arabic often represents a *schwa* possessed by the classical language but which the orthography did not recognize. Thus the *ḍamma* of the diminutive form $C_1uC_2ayC_3un$ was probably *a schwa*. (It is thus represented in the fossils of this form in Classical Hebrew, e.g. *zəʿēyr* 'very little.' See Paul de Lagarde, *Uebersicht uber die in Aramaiscen Arabischen und Hebraischen ubliche Bildung der Nomina*, (Goettingen, 1889), 85-87. Also the imperfect of III and IV.

11 I do not account here for vowellessness as opposed to centralization. The true situation in this regard, as symbolized by the supposed dual function of the Hebrew *swa* needs further investigation.

12 It is probably due to an early confusion with the morpheme of the "elative" as E.A. Speiser has noticed. The extensive forms in Semitic with prefixed *s*- or *š*- are probably also a combination of this form with an added morpheme. Cf. also the Talmudic 3d sing. masc. impf. in *l*- probably the combination of the morphemes *li*- and *ya*- which appears in Syriac as a dialect variant *ne*-.

13 See W. Wright, *A Grammar of the Arabic Language*, (Cambridge, 1896) 1:43.

14 "The Form of the Definite Article in Arabic and other Semitic Language," *Arabic and Islamic Studies in honour of Hamilton A.R. Gibb*, (Leiden, 1965.)

15 *Contra* J. Kurylowicz, "La Mimation et l'article en arabe," *Archiv Orientalni* 18 (1950), 323-328.

16 For example, let there be a dialect *A* in which the C_1: morpheme was in use for verbs but not for nouns, definiteness being expressed by another morpheme or not expressed. In verbs the $C_1: > nC_1$ change takes place. The speakers then come into contact with speakers of higher dialect *B* which has C_1: in both nouns and verbs, but the dissimilatory *n* phone is palatalized and heard by speakers of *A* as *l*. This "definite article" is then borrowed and contrasts with the *n* of the verb.

17 Reconstructed noun endings are -*una* or -*uma* (nominative) -*ana* or -*ama* (accusative) and -*ina* or -*ima* (genitive.)

18 So to say assimilation, but the orthographic *e* covers the allophones on either side of the a/i boundary and is not itself phonemic, so here e represents only the high allophone of *a*. See A.D. Corré, "Phonemic

Problems in the Masora," *Essays Presented to Chief Rabbi Israel Brodie on the occasion of his Seventieth Birthday*, ed. H.J. Zimmels, (London, 1967.)

19 I wish to acknowledge the help of the Graduate School and the College of Letters and Science, University of Wisconsin-Milwaukee in enabling me to research this paper.

Some 'Indic' Features in Pashto

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1.0 Introduction

Pashto is spoken by over twelve million people, more than half of whom live in Afghanistan. The rest live in West Pakistan, with the exception of a few in colonies in India and East Pakistan. There are almost as many dialects of Pashto as there are families of native speakers; but the main isogloss runs from near Peshawar in the north-east to Jaldak (north of Kandahar) in the southwest (Grierson 1921: map facing p. 5). North of the isogloss the language is called [pəxto] or [pəx̊to], and south of it [pəṣ̌to] or [pəšto]. Since the Kandahar dialect, [pəṣ̌to], observes more phonemic distinctions than the other dialects, it is usually considered the standard by American and Russian linguists, and by Afghans who speak it. The dialectal variations do not affect the discussion in this paper, so I shall use the Kandahar dialect for examples, spelling the name Pashto except in quotations. I shall use the name Hindi for Hindi-Urdu, for the sake of brevity.

1.1 Earlier Investigations

Pashto has several features of interest to typologists; some of these have led to confusion in pioneering descriptions of the language. The features discussed in this paper are: "ergative" verb agreement in perfective aspect; unusual initial consonant clusters; use of disjunctive prepositions, or prepositions + postpositions; retention of the category of gender; and retroflex consonants contrasting with dentals.

Since any number of the above features can, at least at first glance, be thought to be Indo-Aryan, Pashto has been considered an Indic, rather than an Iranian, language: "The Pukkhto, in fact, like the Hindī, is a dialect of the Sanskrit as regards its grammatical construction, only Persianised in respect to the bulk of the words composing it." (Bellew 1867: ix). Because of the number of Arabic loans, it has also been considered an Iranian-Semitic mixture: "[Pashto is] in all probability derived from the Zend, Pehlavî, and the Hebrew." (Raverty 1860:4).

Darmesteter's monumental work (1890) proved that Pashto is an Iranian language, descended from Avestan or a similar Old Iranian dialect, having separated from Persian before the Pehlevi or Middle Persian period. Grierson cites Darmesteter and states (1921:5) that Pashto is a "Medic", i.e. non-Persic, or eastern Iranian language. The apparent Indic features are accounted for by the fact that "It has borrowed largely and freely from North Western India but, in its essence, it is an

Erānian tongue." (p. 9; see also Meillet 1922:44-6.) The nature and extent of this borrowing is discussed below.

2.0 The Features

2.1 Ergative

Pashto seems to share with Hindi "ergative" perfective tenses, in which the agent in a perfective transitive construction appears in a different case from that of a perfective intransitive or imperfective (transitive or intransitive) agent:

1) Pashto ƶə xat likəm
'I write a letter'
2) Hindi mɛ̃ cɪṭṭhi lɪkhta hũ

3) Pashto mā xat lika
'I wrote a letter'
4) Hindi mɛ̃ ne cɪṭṭhi lɪkhi

In (1) and (2), the verb is in imperfective aspect, and agrees with the agent, "I". In (3) and (4), it is in perfective aspect and agrees with the victim of the action, "letter".

Persian, with which Pashto is most easily compared for typological purposes in Iranian linguistics, does not share this feature: agents of all verbs in all aspects appear in the nominative, or unmarked case, corresponding to Pashto and Hindi direct (vs. oblique) case. Is this evidence that Pashto has borrowed such an important morphological (if not syntactic) feature from the Indic languages? Historical investigation shows that this is not the case, and that Persian has lost a feature which in Old Iranian and Old Indo-Aryan was a parallel development. Hindi and Pashto have both retained two case-forms for agentive pronouns, while Persian has lost the old nominative pronouns, substituting for them the dative forms, which are now "nominative" in function (Sen 1951:119; Regamey 1954:363-66; Geiger 1893:1-5; Matthews 1953:391-408). The western Iranian languages lost the old nominative, and the eastern ones kept it (Emeneau 1965:41-2; Darmesteter 1890:LXXXVIII-XCI).

2.2 Consonant Clusters

Pashto has some very unusual consonant clusters in initial position. Persian has none except in modern loans, and then only in sophisticated speech. Clusters of the type appearing in Hindi appear in Pashto as well, but Pashto has the following non-Hindi initial clusters: bṛ ɣr ɣl ɣṛ ɣw kṛ xp ṣ̌k lɣ lm lw mṛ mz ng (not ŋg) nǰ nṣ̌ nm nw pṣ̌ pṛ ps pš rɣ rw sxw sṛ ṣ̌n št tl wl zb zd zɣ d͜zm zg zw žw t͜sk (Lorimer 1915:200; Pattanayak 1966:20). I have no explanation for the persistence of these - they cry out for further assimilation - but they are well established and extremely frequent in the language. Morgenstierne's comment (1940:89) seems appropriate here: "Pashto in its turn ... has been subject to a series of violent phonetic changes, affecting as well vowel quality and quantity as simple and compound consonants."

2.3 Prepositions and Postpositions

Another distinction between Persian and Hindi is that the former has prepositions and the latter postpositions. In this respect the Iranian language is the more archaic: the older Indo-Iranian dialects had prepositions and case inflection, and in western Iranian languages the prepositions persisted while the case endings were lost. Indic languages, on the other hand, lost the prepositions and turned the case endings into postpositions (Sen 1951:2). Pashto appears to have retained both:

5) kor 'house' pə kor kṣ̌e 'in the house'
6) mez 'table' tər mez lāndi 'under the table'
pər mez bāndi 'on the table'
7) derš kāl '30 years' tər deršo kālo pori
'until 30 years hence'

It will be observed, of course, that the last element in each of the above phrases is some sort of noun; but the head noun in the phrase is inflected, and the postposed nouns are semantically different from their occurrences as single units. Note that single particles also have this function:

8) dwe baǰe '2 o'clock' pər dwo baǰo 'at 2 o'clock'
9) wrustə 'after' wrustə tər dwo baǰo 'after 2 o'clock'
10) saṛai 'man' saṛi tə 'to the man'

Penzl (1955:41) calls these particles "a type of discontinuous preposition". The case inflections associated with the particles are of the same type as those that appear in Hindi, representing direct and oblique cases. Persian, representing the western Iranian languages, does not exhibit direct vs. oblique case marking: only definite objective status is marked, with a particle -ra. Thus Pashto seems to have retained the type of nominal function-indicators of its precursors.

2.4 Gender

Pashto has marked gender in nominal and verbal forms, as does Hindi. Persian has no gender marking. There is not a great deal to be said about this: Hindi has retained Indo-Aryan gender distinctions, and Pashto has retained (while Persian has lost) Old Iranian ones. The morphemes marking gender in Hindi and Pashto are quite distinct:[1]

12)

		Direct		Oblique	
		sing.	pl.	sing.	pl.
Hindi	m	-a	-e	-e	-õ
	f	-i	-ɪyã	-i	-ɪyõ
Pashto	m	-Ø	-una	-a	-o
	f	-a	-i	-i	-u

What this seems to show is that the category of gender in Pashto is not borrowed from Hindi, but is a retention of a grammatical category lost in Persian.

2.5 Retroflex Consonants

The retroflex consonants of Pashto (or, as will be shown below, some of them) present a different problem than do the features discussed above, all of which (except the clusters?) can be seen to have perdured in Pashto from its Avestan beginnings, rather than developed later. These consonants are: /ṭ ḍ ṛ ṣ̌ ẓ̌ ṇ/. They have full phonemic status and occur in all positions, except /ṇ/, which occurs initially only in the name of the grapheme which represents it, /ṇun/. These sounds caused quite a lot of discussion among the early describers of Pashto; for example (Trumpp 1873:5-6):

> It must surprize us at the first look, that the Pa̤ṣ̌tō alphabet is not possessed of any Aspirates, and in this respect it agrees with the Irānian idioms, but on the other hand it has preserved the full row of the Cerebrals, whereby it closely approaches the Indian Prākrit tongues, yea, it has even preserved a cerebral ṣ̌ (ښ), which has long ago disappeared in Prākrit and the idioms sprang from it.

Trumpp tried valiantly to relate every Pashto retroflex to its Sindhi counterpart, even /ṣ̌/ and /ṇ/, which seem very similar to Sanskrit s̭ and ṋ. /ṇ/ seems to have defeated him, however (p. 14):

> In the use of this sound the Pa̤ṣ̌tō does not always follow the track of the cognate idioms, but according to its own fancy it has sometimes changed an original cerebral ṇ again to a dental and sometimes an original dental n to a cerebral.

Penzl (1955:5) simply states, "The influence of the Indic languages upon Pashto accounts for the presence of such retroflex phonemes as dd, tt, perhaps rr, nn ..."

Darmesteter shows that the problem is not insuperable (1890:XIV-XV; and see the Appendix to this paper):[2]

> Every Pashto word which contains a cerebral is borrowed from India ... In a certain number of original Pashto words there appears a ṛ ړ, which represents a former cluster rd, rt, in the same way that Persian l represents a former cluster rd ... The two sounds - ṛ borrowed from Indic and ṛ derived from rd, rt - do not seem to differ now in pronunciation.

/ṇ/ still proves difficult, and Darmesteter shows (XV) that even in Arabic loans "cette cérébralisation abusive" appears. /ḍ/ is interesting in terms of Hindi (p. XVI):

> Pashto sometimes has ḍ corresponding to Hindustani ṛ: this is one of the instances in which Pashto is more archaic than modern Hindustani ... There are besides considerable numbers of Pashto words containing cerebrals for which Hindustani offers no solution.

Pattanayak (1966:20) states:

> [Hindi] /ṛ/ is a phoneme carrying an extremely low functional load. Borrowed items creating contrast between [ḍ] and [ṛ] in the intervocalic position are responsible for [its] ... phonologisation.

From Darmesteter's list of Pashto reflexes of Avestan consonants (see Appendix) it appears that only /ṭ ḍ/ cannot be traced back to Avestan in some way, and must have been borrowed from Indic. This is not to say that either (1) all examples of these phonemes in Pashto must occur in borrowed Indic words, or (2) all examples of /ṛ ṇ/ etc. came from Avestan rather than Indic. Pashto peṛa (a type of Indian sweet) was obviously borrwed from Hindi peṛa, not descended from something like *paerda; rather, the capacity of Pashto to borrow Hindi /ṛ/ and /ḍ/ as /ṛ/ developed from Avestan rd. As a matter of fact, the cases in which Hindi /ṛ/ corresponds to Pashto /ṛ/ are certain to be late borrowings, for the reasons given above in connection with Hindi /ḍ/. It appears that when Darmesteter lays all Pashto retroflexes to Indic loans he is referring only to /ṭ ḍ/ and late /ṛ/.[3]

Morgenstierne has this to say about the subject (1926: 12):

> Cerebrals are found, not only in Ind. loan-words, but also in many words of uncertain origin, containing un-Indian sounds like x or z ... Thus Psht., and especially the Peshawar dialect, has been largely Indianized in its phonetic system; but it is worthy of note that it has entirely rejected the aspiration of consonants ... The Ind. loan-words in Psht. are generally drawn from modern Hindostani or Lahnda (in contrast with the remarks of Darmesteter ... [p. XVI] the latter source is by far the more abundant).

Specimens of Lahnda being unavailable at this time, I have not been able to investigate this; but the remarkable small number of good correspondences between Hindi and Pashto leads me to believe that it is true.

3.0 Conclusions

It seems clear that despite its many superficial resemblances to Indic languages, Pashto is an Iranian language (one of the most conservative); and that the only features in it which cannot be explained by direct reference to Avestan are the stops /ṭ ḍ/. Emeneau (1965:30) makes the following observation:

> It is impossible ... to suggest in any but the most general way how the retroflexes have developed in the Iranian words in which they are found in such languages as Pashto and Yidgha. Bilingualism, involving Indo-Aryan languages, must be the answer, but no historical and social details can be given to assist in elucidating the process.

My own tentative explanation for all of the phenomena discussed above, i.e. ergativity, initial consonant clusters, use of prepositions with postpositions, gender distinction, and retroflex stops, is the following: The Iranian languages had these features, or the seeds of their development, to begin with. In the western or Persic branch, these features or potential features died out before the development of Modern Persian. In the eastern branch, they were retained, and augmented by retroflex stops. The retention was no doubt caused by areal factors; that is, contact with the Prakrits from which the modern Indic languages developed (with Emeneau, I am considering the Dardic languages a branch of Indic). The fact that aspiration was not borrowed is significant, and leads to the following hypothesis concerning the "borrowing" (not really a borrowing at all, according to the hypothesis) of the retroflex stops: It is probably the case that [ṭ] and [ḍ] were present in Pashto as allophones of /t/ and /d/ in some environments, and that borrowed items from Indic languages caused the phonemicization of these retroflex allophones in the same manner that borrowed

English words have caused the recent phonemicization of Hindi /ṛ/. Darmesteter (1890: XXI, XXVII) implies that this is also the history of Pashto /d/ and /g/.[4] Phonemicization of an allophone through the influence of borrowed items is infinitely more likely to happen than is wholesale adoption of a feature completely foreign (and unnecessary, since Pashto was presumably getting along all right without the retroflexes before) to the influenced language. The fact that in Pashto some retroflex consonants had developed in a normal way from Avestan makes this a reasonable guess, much more attractive a hypothesis than outright borrowing of the whole series.

Better and perhaps quite different explanations will no doubt come to light as it becomes possible to investigate other eastern Iranian languages (Ormuṛi, Shughni, etc.) in comparison with Pashto and the Dardic languages. Unfortunately, earlier stages of Pashto are not preserved for examination, and the Perso-Arabic alphabet is particularly unhelpful in the examination of written records for phonological changes. Morgenstierne's An Etymological Vocabulary of Pashto (Oslo, 1927), which I have been unable so far to find, may shed some valuable light on the relative chronology of the various phenomena discussed in this paper.

APPENDIX

Pashto consonant phonemes and the Avestan consonants from which they developed (Darmesteter 1890:XIX-XXXVIII); note that *-C* stands for both *-C* and *-C-*.

PASHTO	<	AVESTAN	PASHTO	<	AVESTAN
p		p-	z		z, -č
b		-p, b	š		s
t		t-	ž		ǰ, y
d		-t	ṣ̌		š-
ṭ			ẓ̌		-š
ḍ			m		m, -b
k		k-	n		d, ð
g		-k	ṇ		rn
ts		č-	l		-t, -θ, -n, d-, -ð, r
dz		-č			
č		č-	r		r
ǰ		ǰ, y	ṛ		rd, rt
x		x	h		h
γ		γ, g	w		w, f, b-, -p
s		s, č-			
			y		y

NOTES

[1] This table represents only one class of nouns in each language. For a complete Pashto declension see Penzl (1955:61, and for Hindi, Kachru 1966:41.

[2] I have translated all long quotations from Darmesteter's original French.

[3] Darmesteter committed one serious error in recognizing only two dialects of Pashto, and assuming that, in the Kandahar dialect, [š] and [ṣ̌] were not separate phonemes. He seems to have been led astray by the orthography, in which the grapheme for /ṣ̌/ represents [x] (which has merged with the /x/ from other sources) in the northern dialects. However, on the basis of dialect geography it seems that [ṣ̌], or something like it, was present in "Proto-Pashto" and that, in the other dialects, it merged with other phonemes; so Darmesteter's list of correspondences still holds.

[4] From the table in the Appendix, one sees that Avestan d > Pashto /n l/, and g > /γ/. It seems reasonable to assume that Pashto [d] and [g] were allophones of /t/ and /k/, and later developed full phonemic status through borrowing and/or vowel loss, after which, if my hypothesis is to stand, [ṭ] and [ḍ] were phonemicized.

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